PRODUCTS

October, 1936

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OAKITE

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SPECIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS

Announcement —

EFFICIENCY PLUS BEAUTY

CIVILIZATION is said to be approximately 60 centuries old, yet it has only been during the past hundred years that human intelligence has manifested itself by the development of time and labor saving devices on an important scale. The past century has seen more application of skill and inventiveness toward the emancipation of mankind from hard labor than all of the previous 59 centuries combined.

Truly the past century has been an age of invention. The sewing machine, the steam engine as we know it today, the electric generator and motor, the telephone, the radio, the internal combustion engine, the mechanical refrigerator—all of these have been born within the past century. And it is not at all likely that we have neared the end of our inventive resources.

With the perfection of these various mechanical devices, it was enough that victory was achieved in the realization of the objectives sought. Mechanical success always has been the first step, followed by refinements and improvements toward the goal of mechanical perfection. The applications of power to our tasks—industrial, commercial, or domestic—have been wonder enough; the demand has been too great and the manufacturers have been too busy to spend too much time enhancing the appearance of their products.

Within the past few years, however, this situation has changed. Mechanisms which a few years ago were marvels of engineering skill are today taken for granted. The most important factor in the merchandising of metal products today is appearance.

Beauty in industrial design has come into its own. Henceforth manufacturers will find an increasing tendency to give pleasing design

and finish as much consideration as adaptability or efficiency when a selection is being made. And this does not apply to consumer products alone; it applies to power units, machine tools, and industrial equipment as well.

The development of consumer-demand for pleasing appearance has drawn upon the skill of the research engineer, and he has responded in a wholly satisfactory manner. Today we have rust-proofing processes which seal against deterioration indefinitely, rubber paint for use where expansion and contraction is unavoidable, glass which can be sprayed to form linings in receptacles of any size required, and a multitude of other marvels of the chemist's art.

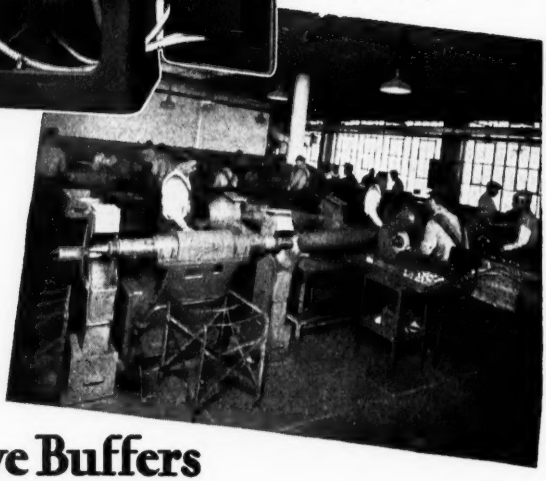
Developments in the field of metal finishing are coming with increasing rapidity, and those who are responsible for results in this field will be interested in keeping abreast of events concerned with development and application. To this service PRODUCTS FINISHING is dedicated.

With this, the first number, PRODUCTS FINISHING assumes the task of searching out and disseminating the newest and best information available concerning metal finishing methods in all of its various ramifications, including cleaning, polishing, buffing, plating, lacquering, and so on, and neither effort nor expense will be spared in the performance of this task.

"Service to the Industry" will be the foundation of our policies, and we bespeak the support and cooperation of the industry.

DON G. GARDNER,
Publisher.

HOWARD CAMPBELL,
Vice-President in charge of editorial.



21

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October 1936—Still in constant operation and have not cost one cent for repairs or service.

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CINCINNATI, OHIO

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Volume 1 OCTOBER, 1936 Number 1

More Than 13,000 Circulation This Issue

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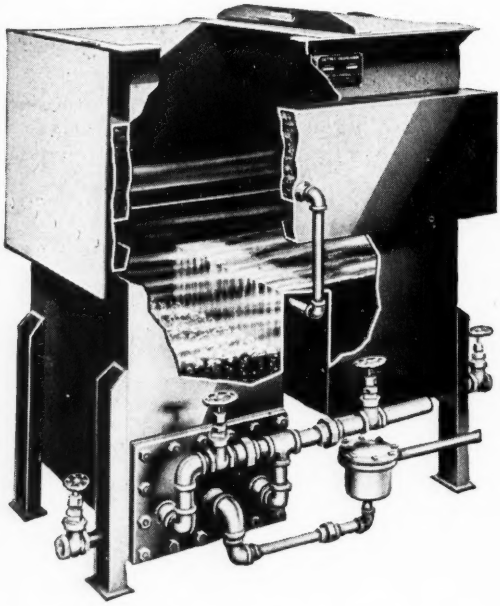
TRIAL OFFER
of a DETREX DEGREASER



Steam Heated Detrex Degreaser. Piping shown on front of machine is supplied by user.

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The great saving in your cleaning costs, with better quality of product, will thus be proved.

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PRODUCTS finishing

CINCINNATI, OHIO VOL. I NO. 1

OCTOBER, 1936

Good Equipment + Original Methods = Success for Plating Plant

BY FRED W. VOGEL

FOR a long time manufacturers of machine tools and metal consumers products were able to merchandise their articles without giving much attention to their sales appeal. But today, due to the increase in production, an inevitable and very essential factor — competition — has been introduced. This factor, accompanied by the demands of the consumer, is turning the attention of the manufacturer to better methods of finishing his products.

At first, where a relatively permanent finish on small articles was desired, plating was tried with remarkable results. Today, plating is no longer confined to small articles such as household utensils but has found its place in the finishing of large industrial objects. The purpose of plating the small household utensils is primarily that of beauty while that of the large industrial objects is protection against the elements, protection against wear due to friction, and appearance.

Among the better plating plants in the middle west which have helped to bring about the "era of appearance" in metal finishing is Creutz Platers, Inc., at Cincinnati, Ohio.

This plant, with its adequate equipment and incorporation of modern methods, is capable of handling a wide variety of work. Backed by sixty-five years' experience, this company has a reputation for quality plating which reaches to points half way around the world.

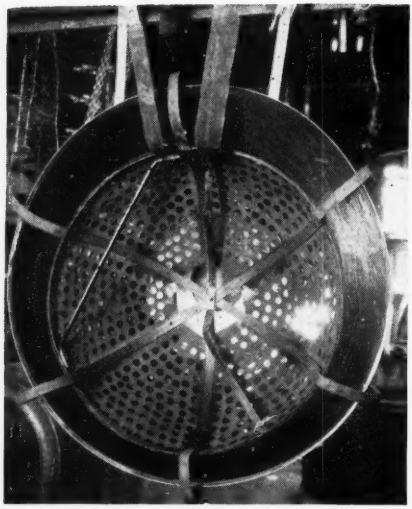


Fig. 1—Concave-Shaped Workpiece with Anode in Place for Chromium-Plating.

The plating of hotel cutlery and silver utensils of every kind and description comprises a greater part of the work done in this shop. No replating is done over the old plate that remains on utensils; in order to turn out plate of highest quality, it is necessary to remove all of the old plate, thus making it possible to apply a smooth, even coat over the entire surface of the object.

The silver stripping solution tank, for the purpose of removing old plate, is kept in almost continuous operation. The method employed to remove the old silver plate involves the use of a stainless steel anode which is used in connection with a reverse current. Reversing the current removes the old plate from the object and attempts to deposit it on the stainless steel anode. The stainless steel anode, however, will not plate; consequently the old silver drops to the bottom of the tank, from which it is later reclaimed.

Since the introduction of chromium plate into the metal finishing field there has been a vigorous attempt to apply this type of finish to almost every kind of metal product. Although considerable experimenting

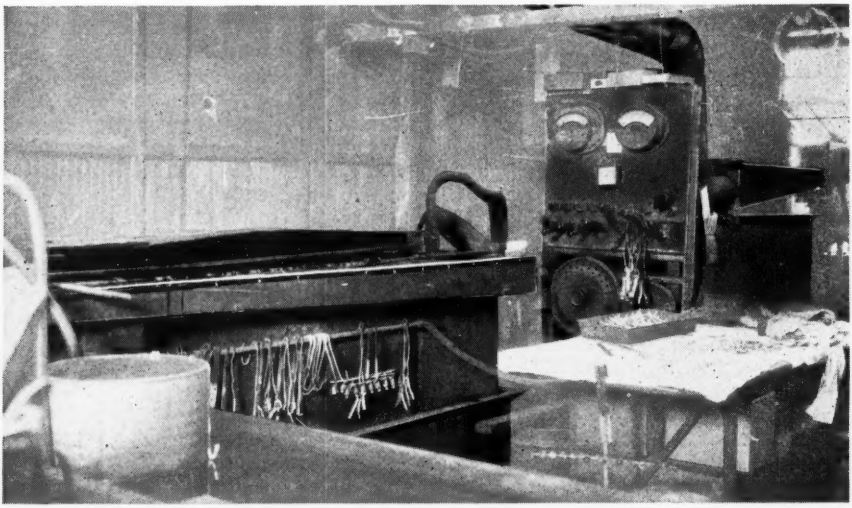


Fig. 2—Chromium-Plating Tanks. Note the Vents for Carrying off Fumes.

Fig. 3—General View of Side of Shop, Showing Three Silver and Three Nickel Plating Tanks.

has been in progress toward the development of the most satisfactory chromium bath, even more has been done in the application of the chromium plate to irregular surfaces. Such a surface is difficult to plate with chromium, especially when the workpiece is of concave shape, due to the difficulty of "throwing" the chromium. However, the problem has been solved in this plant through the use of special anodes which are formed to the approximate shape of the surface to be plated. Thus when the anode has been properly attached to the workpiece, it will be in sufficiently close proximity to the surface of the work so that it will throw the chromium and will provide an even plate over the entire surface of the work.

An interesting job that came into this plant recently consisted of several huge copper surgical operating lamp reflectors which were to be chromium-plated on the concave surfaces. After considerable experimen-

Fig. 4—Tumbling and Burnishing Barrels. A Udylite Plating Barrel is Visible at the Far End of the Line.

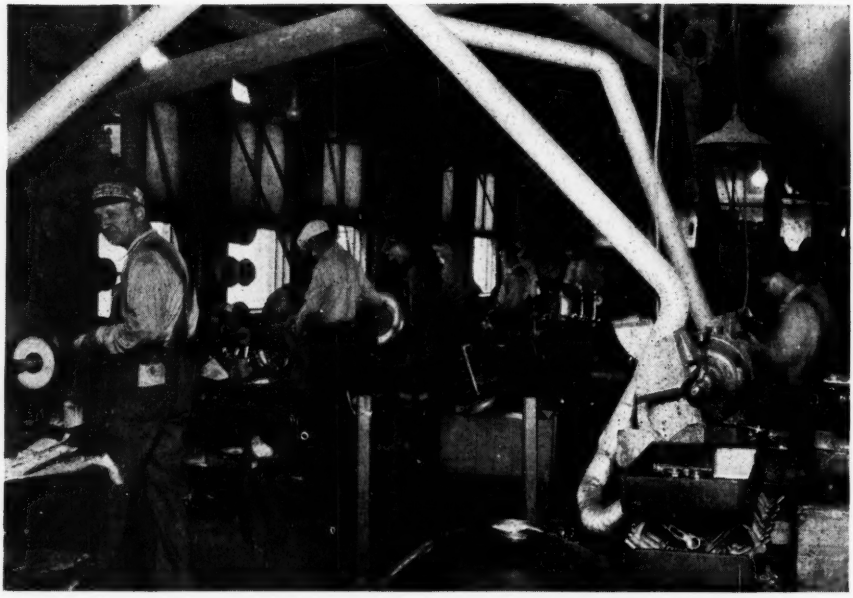


Fig. 5—One End of Polishing Department.

tation, an anode was developed which deposited the chromium in a thoroughly satisfactory manner. The anode is shown, clamped in position, in Fig. 1. The close proximity of the anode to the concave surface of the reflector, together with the perforated holes, made it possible for the anode to throw the chromium evenly over the concave surface.

The tanks into which these reflectors were immersed are shown in Fig. 2. As you can see in the illustration, the chromium solution tanks are equipped with ducts through which fumes from the chromium bath are drawn off by the blower system and dissipated. Such equipment is essential in chromium plating due to the detrimental effects of the chromium fumes upon the nasal passages of the operators.

A general view of three nickel and three silver solution tanks is presented in Fig. 3. Two of the three nickel tanks are furnished with automatic agitators, while all three of the silver tanks are agitator-equipped. At the left in this same illustration one tin and one cadmium plating tank can be seen.

Cadmium plating is being widely used as a finish for many products since the coating is not only a very efficient rust-preventative, but also has a very definite eye-appeal. When properly applied, cadmium has a beautiful silvery white luster. Since cadmium plate resists weak alkalis such as are present in soaps, many manufacturers of this product find it profitable to have parts of their soap-making equipment finished with this corrosion resisting plate. Another advantage of a cadmium-plated surface is that it can be soldered. Radio receiving set chassis as well as many of the smaller parts which go into the completed unit are finished by plating with cadmium.

Fig. 6—Buffers Used to Apply Polish to Silver Plate.

The efficiency of cadmium plating operations is aided through the use of ball anodes contained in helical coil, steel wire containers. The advantages of the ball anode are that constant anode area is maintained; scrap losses are eliminated and the metal balls are easy to handle.

After articles have been plated they are dried in the sawdust tumbling barrels, several of which are shown in Fig. 4. At the extreme left a ball burnishing machine can be seen. In the background of the same illustration are three barrel type burnishers.

One section of the polishing department is shown in Fig. 5. The polishing lathes in this department are of the Webster and Perks make while the buffing lathes shown in Fig. 6 are Gardner buffers.

A considerable amount of work that comes in requires enameling or lacquering. To accommodate such work this shop maintains a separate department, a section of which is shown in Fig. 7. Here two operators can be seen, one spraying enamel on a base for a barber chair, the other applying a coat of enamel to a pressed metal product of smaller size. Here again workers are protected against deleterious effects from lacquer and enamel fumes by fans located in the rear of the booths. The spray guns used by the two men are made by the Paasche Company. Enameled articles are baked in two large ovens which were especially constructed for this firm by the Davis Welding Company.

Aside from the usual cleaning operations which must be done before

Fig. 7—Two of the Spray Booths in the Enameling Department.

enameling or lacquering, a considerable portion of the work is required to be sand blasted. A view of a Pangborn sand blast machine used in this operation is shown in Fig. 8. This machine is of the type which can be operated from the outside, the operator inserting his arms through two "sleeve" apertures and watching the progress of the operation through a glass plate in front of the machine.

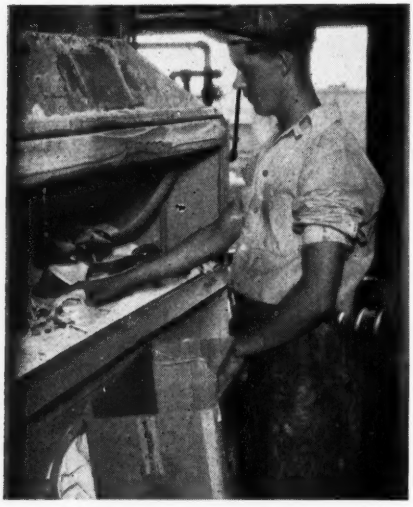


Fig. 8—A Pangborn Sand Blast Machine Provides for Sand Blasting of Work That Must be Cleaned.

Articles such as hotel silverware, silver candle sticks, and other silverware that are sent in to the Creutz shop for replating frequently require repairing. In order that the customer may be assured of a first class job of restoration and replating, this company maintains a repairing department in which expert artisans are employed. Customers who send in articles that have been damaged can be assured that their wares will be returned in a condition practically identical to that in which they were originally purchased. The constant growth of this business is an indication of the rising tide of appreciation of finish and design.

SCIENTIFIC METAL CLEANING. The details of applications and outstanding features of Detrex Degreasing with Perm-A-Clor or Triad Safety Solvents, and the applications of Triad Alkali Cleaning Compounds and Strippers, are carefully outlined in a 12-page booklet entitled, "Scientific Metal Cleaning" that has just been published by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Mich. It is well illustrated with photographs of various standard and special designs of Detrex Degreasers. The booklet explains how machines of this type can be used for the rapid and economical cleaning of metal products prior to finishing, inspection, or heat treating. Copy free upon request.

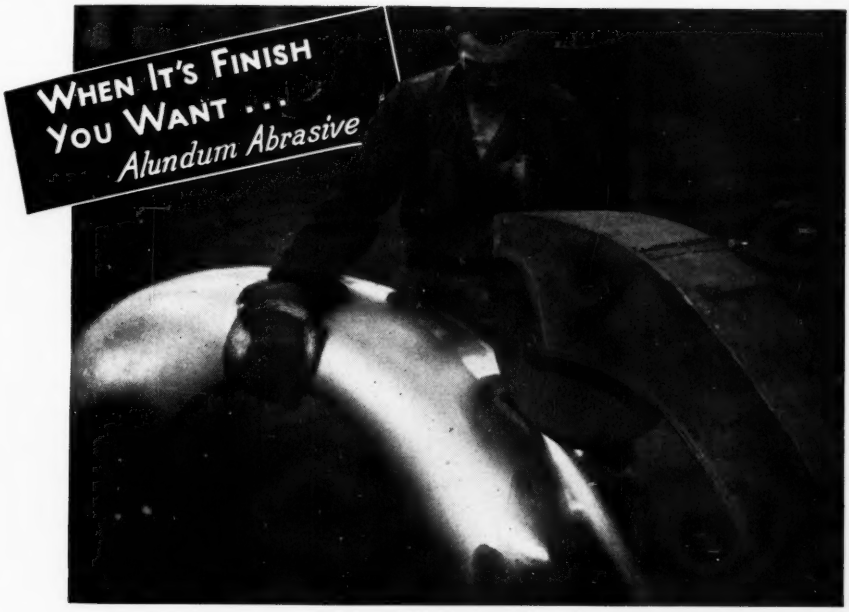
DEGREASING EQUIPMENT. A line of equipment with which all kinds of products can be degreased and cleaned by vapor method, by dipping or immersion, or by spraying with solvent are described and illustrated in a folder which is now being distributed by the Detroit Rex Products Co., 13017 Hillview Ave., Detroit, Mich. Copy free upon request.

INDUSTRIAL DUST CONTROL. To fill a most important niche in the industrial executive's library comes a new book published by the Pangborn Corporation of Hagerstown, Maryland on "Industrial Dust Control Through Exhaust Systems."

Expertly written by W. O. Vedder, the book charts the progress made by various types of dust collecting systems to the present time, and outlines in easy to understand style the many advantages that modern dust control is bringing to industry today.

A few of the many subjects thoroughly discussed by Mr. Vedder include chapters on Exhaust Hoods and Piping System; the Dust Collecting Equipment; Types of Collectors in General Use in the Industrial Field; the Exhauster and Drive; and the Operation and Maintenance of Exhaust Systems.

The supply is limited but while they last the Pangborn Corporation will send copies without charge or obligation to engineers and executives when requests are received upon company letterheads.



FINISH is essential in the polishing of automobile fenders — there can be no imperfections in their surface — no die marks to show through the enamel. Because Alundum Abrasive gives just the desired finish and does it quickly and economically too, it is the popular choice throughout the automotive industry.

Of course, there are definite reasons why Alundum Abrasive does such a good job — and three of them are:

1. **Uniform Size** — special Norton sizing methods insure grains of exceptional uniformity — no oversize grains to scratch or mar the surface.
2. **Strong Shape** — special Norton crushing and screening processes give a strong, blocky shaped grain (designated as E-1) that stands up and gives long life.
3. **High Capillarity** — special Norton treatments give a grain of high capillarity. It sticks to the wheel head in spite of the severe treatment it receives in fender polishing.

Norton engineers who have had years of practical polishing experience will be glad to study your polishing jobs — to make sure that you get just the right abrasive in size, shape and treatment that you require.

Norton Company
Worcester, Mass.

G-30

NORTON ABRASIVES

Alloy Plating

By George B. Hogaboom

Hanson-Van Winkle-Munning Co.

THE electro-deposition of two or more metals as a composite mixture has been done for a long time but, unfortunately, very little is known as to what actually occurs. It will take a thorough X-ray study to determine whether the electrodeposited alloy is a real alloy or just a mixture of the crystals of metals. As we understand alloys there is a definite solution of one metal with another to form another metal which has destinctive characteristics. In most alloys made by fusion one of the metals is saturated with the other, and there is also some uncombined metal. The result is what might be called a new metal having properties that are entirely different from many of the metals used in the alloy.

Brass is a good example. It is an alloy of copper and zinc or copper, zinc and lead. The zinc is dissolved in the copper and does form a true solution. Some of the copper or some zinc can exist undissolved and lead although added to give definite characteristics does not dissolve either the copper or the zinc alone or in the copper-zinc alloy. Different percentage ratios of copper and zinc make different colors of brass and there is the red, green, yellow and bronze brass.

In the electrodeposition of brass the same color effects can be had by change in the copper-zinc ratio of the deposited metal. It is true that the same percentage ratio of copper and zinc have a different color when cast or electrodeposited. A copper-zinc electrodeposited brass of 80-20 ratio has a color that matches a 65-35 rolled brass.

This same is true with nearly all the metal alloys. Copper added to gold produces a red gold, while silver is used to make a green gold. Tin added to copper gives a true bronze. Cadmium mixed with silver imparts a tinge of pink. Zinc or copper electroplated with nickel produces the least understood of all electrodeposited alloys—black nickel. In the non-ferrous field there are numerous alloys and the change of color is nearly always effected by the combination of different percentages and the physical properties are also changed.

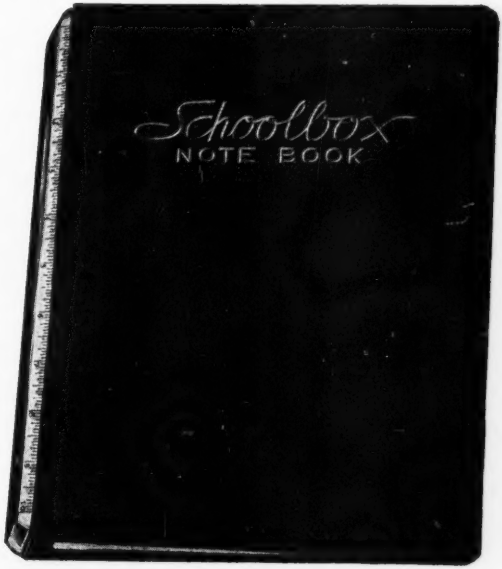
There is one interesting exception in the electroplating of alloys that at present commands attention. In this electrodeposited alloy there is little change in color, a slight difference in the physical properties but a remarkable change in lustre. The lustre of the electrodeposit is far different from what is obtained by the use of addition agents in any other single metal or alloy. While an addition agent is used in the plating solution it is not included in the deposit which is so evident in many other bright electro-coatings. That this is so is proved by extreme ductility of the alloy deposit, exceeding in some degree the ductility of the electrodeposit of either metal alone.

The alloy referred to is the nickel-cobalt alloy. This alloy can be deposited upon ferrous or non-ferrous metals and will have a lustre that makes everyone who sees it for the

first time inspect the surface carefully to see whether it has not been color buffed. Bending, forming or distorting the basis metal in any way does not effect the deposited alloy. The fine texture and ductility of the deposit exceeds that which has so far been obtained in the electro-deposition of many single metals and all alloys. Its physical characteristics are better than that of either nickel or cobalt electrodeposits whether deposited as a dull or bright metal.

It makes no difference whether the solution is contained in a beaker in the experimental laboratory or in a large tank of a full automatic plating machine in a commercial plant that may be operating 24 hours a day. On brass or steel the results are the same. Here we have two metals, comparable in color and physical properties that if melted together will produce an alloy in which color and strength are but slightly changed, yet, when brought together in an electroplating solution in which there is a very small amount of a completely soluble organic chemical, distinctively new properties are imparted to the alloy, ductility and lustre. There is not in the electroplating field a more interesting electrodeposited alloy.

The solution used is not a complex solution that requires continual adjustment to obtain consistent results. The content is the same as that of any ordinary warm nickel solution except for the addition of cobalt salt and a soluble organic chemical. There are bright nickel solutions that have merit, but the chemicals used are closely guarded and the content not capable of control by analysis. This is in contrast with the nickel-cobalt bright solution. All of the chemicals can be purchased on the open market and what is important for continual production of good work, the quantity of each and every chemical of the solution can be controlled by easily understood chemical analysis. The chemicals used in making the solution are single nickel salts, nickel chloride, cobalt sulphate, ammonium sulphate, nickel formate, and formaldehyde.



"A typical use of bright nickel plating on a specially designed notebook developed by The National Blank Book Company. The back can be used as a container for a pencil and eraser. The nickel is deposited on cold rolled steel which is neither buffed before or after the deposit. Plating is done in a full automatic conveyor on a 24 hour schedule."

The solution is operated at 140 deg. F. A current density from 20 to 100 amperes per square foot can be used, without any change in lustre and this can be obtained whether a deposit of 0.00002 in. or .002 in. is desired. The deposit is completely "active" and

Bright nickel plating, as supplied by modern methods, can be subjected to such deformation as this without damage to the plated surface. The plating is .001 of an inch thick, applied on both sides of steel strip .0157 of an inch.

▼

does not require "activating" in any solution previous to receiving a deposit of chromium. The color of the chromium is improved by being deposited over this bright nickel-cobalt alloy.

The advantage of a bright electrodeposit is too well known to discuss. All the metal deposited is on the work and there are no thin places that result from buffing dull deposits regardless of how carefully the buffing is done. If to this is added a color that approaches chromium which makes the ideal undercoat for chromium deposits and a metal coating that is so ductile that it will withstand forming operations then an ideal electrodeposit is had. This is only possible with a nickel-cobalt electroplated coating.

"PONTALITE" SYNTHETIC GLASS. E. I. du Pont de Nemours & Company has perfected a new water clear plastic which will be produced in a new plant under construction in commercial quantities early in 1937. The new material which is called "Pontalite" was described by H. R. Dittmar of the du Pont research staff before the recent convention of the American Chemical Society in Pittsburgh.

Pontalite is what is known as an acryloid resin. It is only half as heavy as common glass, but is as clear as optical glass and is so strong that it will resist tension of 4 to 5½ tons to the square inch. Though softer than glass, it is hard enough to be widely useful. It is thermo-plastic and can be sawed, cut, drilled, and polished and molded to any desired form. A liquid intermediate variety can be poured into molds and hardened.

Unlike glass, Pontalite transmits a large proportion of the sun's ultraviolet light, but is unaffected by sunlight. Solutions of the plastic can be used as a lacquer and for impregnating wood, cloth, paper, stone and electrical apparatus. Many chemical variations can be produced ranging all the way from hard heat resistant solids to heavy viscous liquids.

DETREX DEGREASERS. Three standard Detrex Degreasers which are offered for trial in plants desiring to increase speed and reduce costs of their cleaning operations are illustrated in a four-page folder issued by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Mich. The folder describes a line of alkali cleaning compounds and strippers also manufactured by this firm.

BROWN "AIR-O-LINE" AIR OPERATED CONTROLLERS. A catalog of air operated controllers designed for the control of temperature, pressure, flow, and liquid levels, indicated as catalog No. 8901, is now being issued by The Brown Instrument Company, Wayne & Roberts Aves., Philadelphia, Pa. The catalog covers the complete line of Brown Air-O-Line Air Operated Controllers. It explains in simple non-technical language the principle of operation of Brown Air Operated Controllers and contains, as well, many helpful diagrams illustrating their simplified construction, the ease with which control units may be interchanged and the ease of tuning in for throttling range and automatic reset.

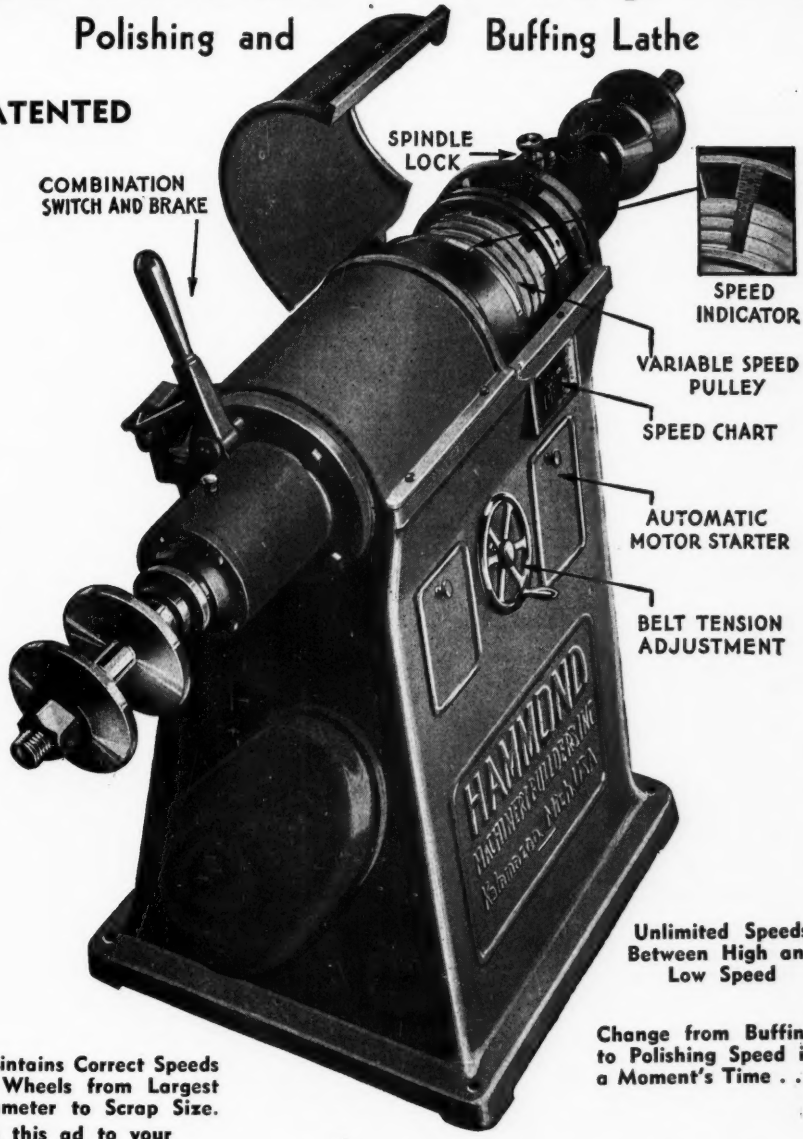
Catalog No. 8901 also contains complete descriptions of Brown features, universal cases and their drilling dimensions, Brown Air-O-Motor Valves, Valve Positioners, the Air-O-Motor, and the Brown Power Cylinder. A copy of the catalog will be sent to any manufacturer operating equipment upon which temperature, pressure, flow and liquid level controls are used.

CLEANING BEFORE RUST-PROOFING. Speed, economy, and satisfactory cleaning before rust-proofing and finishing operations which can be obtained by the Detrex method of solvent degreasing is pointed out in a leaflet which is being distributed by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Mich. This leaflet is illustrated with photographs of automatic Detrex Degreasers for the production cleaning of metal products by the use of either Perm-A-Clor or Triad Safety Solvents.

Hammond VariSpeed

Polishing and Buffing Lathe

PATENTED



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KALAMAZOO, MICHIGAN, U.S.A.

Fresh Air System Expedites Work in Cleaning and Plating Departments

By W. W. Boone
Chief Chemist, Crosley Radio Corporation

PRODUCTION has been increased, quality has been raised, and comfortable working conditions have been assured in the ultra-modern cleaning and plating departments of the Crosley Radio Corporation, by the installation of a blower system of the most modern type. It is usually considered good practice to locate plating departments on upper floors where cross ventilation prevails so that the steam and acid fumes can pass out through the open windows, but in order to achieve the most economical manufacturing layout at the Crosley plant, it was necessary to locate this department in the basement of the main building. With no windows of any size and no cross-currents of air, the supplying of fresh air became a primary problem. A blower system capable of making a complete change of air in the department every two minutes and replacing it with cool fresh air in summer, or warm air in winter, was the answer.

The work in process consists of parts for both the radio

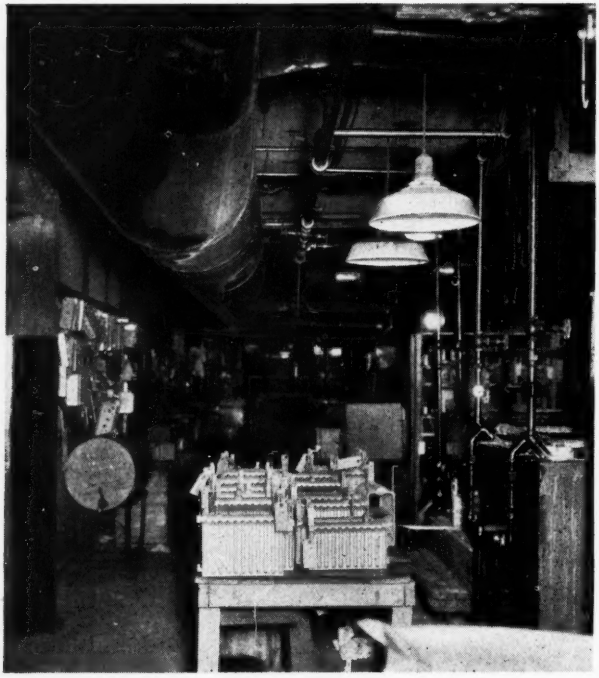


Fig. 1—Main Exhaust Duct for Exhausting Fumes from Plating Department of Crosley Radio Corporation's Plant.

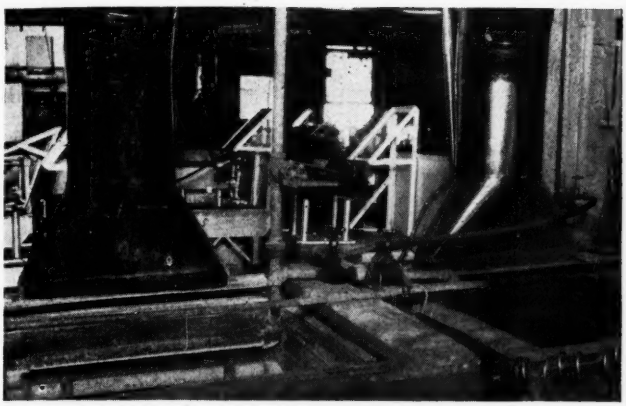


Fig. 2—A vent extending around three sides of the solution tank at the top draws off the steam from the solution.

sets and the "Shelvador" refrigerators made by this firm. Some of the parts are tinned, some are galvanized, some chromium-plated, some cadmium-plated, and all require cleaning. The department in which this work is handled contains approximately 15,440 square feet of floor space, with the equipment arranged in the most logical order for ease of handling.

Included among the equipment are a Hanson-Van Winkle-Munning full automatic cadmium plating machine, two Frederick Stevens semi-automatic tin plating machines with Alkaline Stannate baths, six hand tin plating tanks, 12 barrel cadmium plating units, three hand zinc tanks, two copper plating tanks, four six-ton galvanizing pots, two large automatic acid pickling tanks, five hand pickling tanks, several washing machines, and an automatic degreaser.

Without an efficient ventilation system, the difficulties of working in an atmosphere charged with steam, acid fumes, and fumes from molten metal can well be imagined.

To insure a complete change of air within a two-minute range, the fumes are exhausted and fresh air is blown into the department simultaneously. This necessitates two complete sets of ducts. All exhaust gases are carried up and expelled eight floors above the plating room level. Many of the plating tanks are ventilated with side hoods using a down draft system exhausting gases through underground ducts. Each system comprises trunk ducts from which the

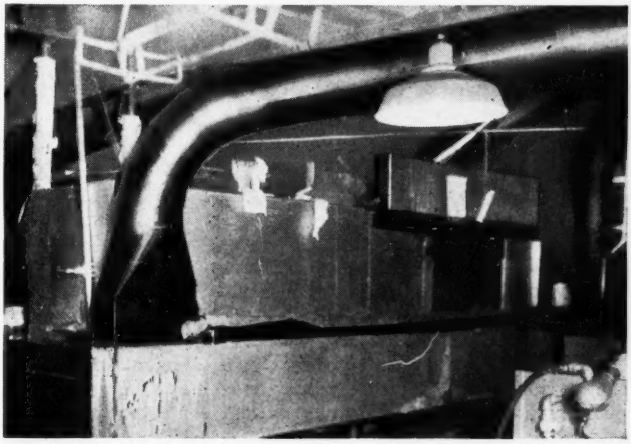


Fig. 3 — Automatic Pickle Tank with Continouus Conveyor.

smaller branches radiate in all directions. One of the main exhaust ducts is shown in Fig. 1.

To exhaust air from the department, one Sturtevant and three

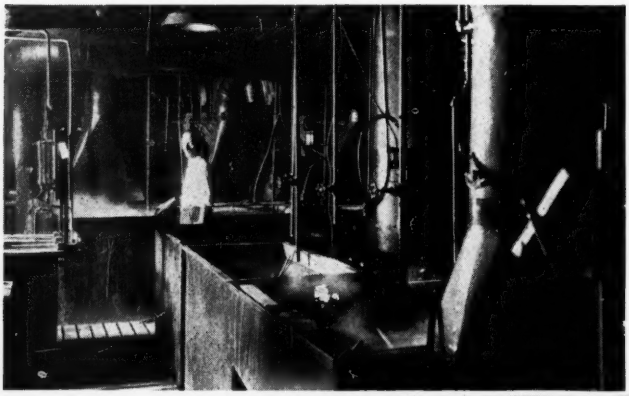
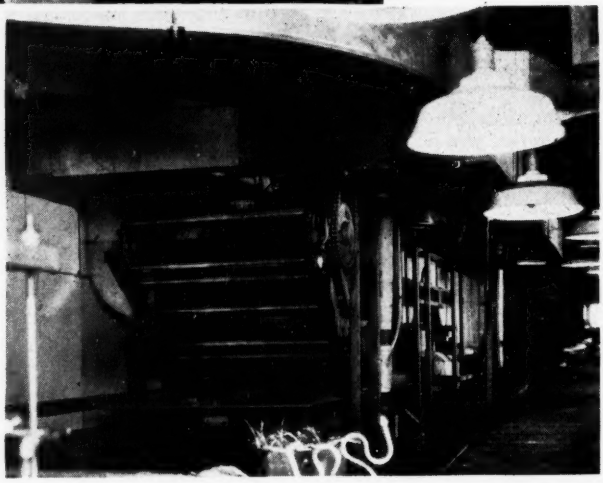


Fig. 4 — (Above) — The manner of applying exhaust piping to the tanks can be seen in this illustration.

Fig. 5—(Right) — Large Automatic Pickling Machine. An unusually large exhaust duct is required in this instance.



American Blower fans are used with a total exhaust capacity of 126,000 cu. ft. per minute. At the same time an American Blower supply fan drives fresh air into the department at a rate of 30,000 cu. ft. per minute; thus there is always an abundance of fresh air.

The size of the ducts used for exhausting the steam and fumes from the various tanks and machines was determined after lengthy experiment and test, during which it was discovered that steam was the most difficult to exhaust. Consequently the exhaust vents from the washing machines and hot water tanks are slightly larger in size than the exhaust vents for exhausting the acid fumes. To preclude the possibility of corrosion due to the fumes from the acid, the exhaust ducts are lined with a light coating of lead.

An effort has been made to shape the openings of the exhaust ducts according to their particular applications, although in some cases it has been necessary to design the openings in such manner that the ducts will not interfere with the work. Thus, as shown in Fig. 2, the opening to the exhaust ducts on the cleaning tanks are simply long slotted vents extending around three sides of the tank in this case. How-

ever, the vent slots are wide enough so that the suction created by the blower draws down practically all of the fumes into the exhaust hood and away from the operators.

Figure 3 shows an automatic pickle tank with a continuous conveyor. This machine is entirely enclosed, with an opening on each side. An operator stands at each opening and removes each pickled piece as it reaches the loading station, at the same time replacing it with an unfinished piece. To carry off the fumes from the pickling operation, a suction pipe is located at each corner of the machine, as shown in the illustration. Thus, inasmuch as the only openings for the intake of air are at the loading and unloading stations, the fumes are continually drawn away from the openings and are prevented from passing out into the open air.

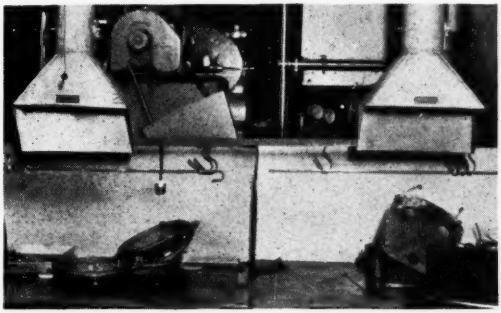


Fig. 6—Brazing Benches. Exhaust ducts are provided here to carry off the spelter fumes.

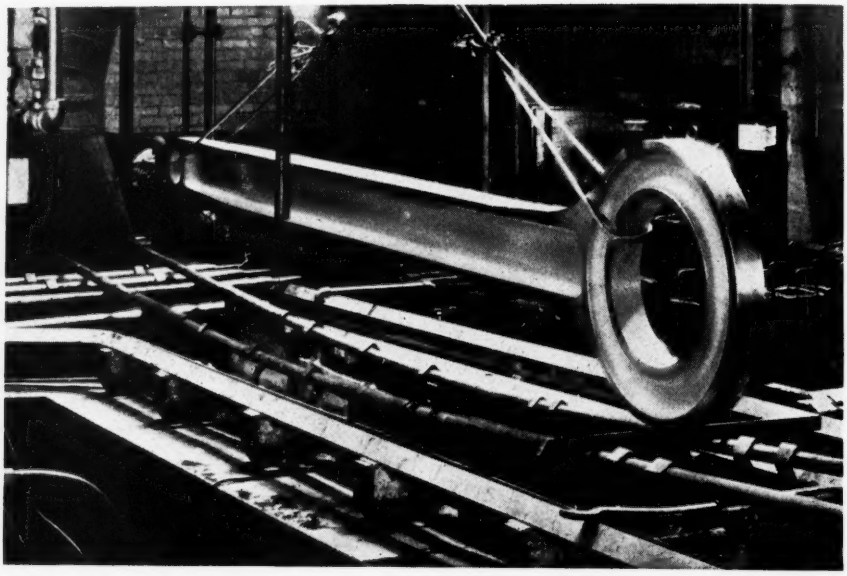
The manner of applying exhaust piping to the cleaning tanks is again illustrated in Fig. 4. Case of the tank in the foreground, the duct had to be applied at the end of the tank, but the vent hood opening is large enough so that the exhaust is effective and practically all of the fumes are carried off.

A large automatic pickling machine is shown in Fig. 5. In this case the exhaust piping is of the square type, and is of large capacity, as can be seen. The large size of the pipe is due to the unusual length of the machine and the corresponding large amount of gases evolved in the pickling operation. The fume situation here is further aggravated by the fact that the acid is constantly agitated due to the action of the automatic conveyor, but the exhaust duct is of ample size to carry off all fumes.

Although the equipment shown in Fig. 6 is not, strictly speaking, a part of the cleaning and plating department, advantage has been taken of the air exhaust equipment to locate brazing benches at this point. Brazing operations produce fumes which are highly injurious to the health of the workers if inhaled in any quantities or over a period of time, but with exhaust equipment available with which the fumes of the spelter can be drawn off, the brazing operation is rendered completely innocuous.

The air circulation system at the Crosley plant is an excellent example of modern manufacturing plant facilities and the manner in which such facilities can be adapted for the health and comfort of the workers and convenience in plant layout.

CROMODIZING RUSTPROOFING PROCESS. Excellent rustproofing at low cost is claimed for "Cromodizing," a process developed by the American Chemical Paint Company, Ambler, Pa. By preventing rust from forming beneath paint films, this treatment is said to solve the problem of keeping steel units in serviceable condition. Cromodizing is adapted to protecting any type of steel surface regardless of size, shape or previous processing. Because of the low cost of the process, cromodizing makes available to a wide field of steel products the benefits of a lasting finish.



A Chrome-Plated 12-foot locomotive main rod, made by The Timken Roller Bearing Company for use with Timken Bearing on a high speed passenger locomotive.

Chrome-Plating Side Rods for Locomotives

The chrome-plated, heat treated alloy steel locomotive main rod shown in the accompanying photograph is one of a set consisting of two 12 ft. main rods and four 9 ft. side rods designed and built by the Timken Roller Bearing Company for use with their bearings on heavy duty, high speed steam passenger locomotives. Weighing only 510 pounds, the rod shown represents a substantial saving in weight as compared with standard construction, contributing materially to the increase in speed and reduction in hammer blow of these modern locomotives.

Among the largest chrome-plating jobs ever done as a single operation, these main and side rods required the construction of a specially designed chrome plating tank 17 ft. long by 3 ft. deep and 3 ft. wide at the Timken plant. Current is supplied by a Timken equipped generator set capable of supplying 6500 amperes at 6 volts.

Special provision has been made in this new Timken chrome plating installation to control both the temperature of the piece and the bath to assure the uniform, dense coating required to withstand the severe conditions to which locomotive parts are exposed. *(Continued on page 29)*

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A Rapid and Accurate Method for the Determination of Chromic Acid and Trivalent Chromium in Chromium Plating Solutions

By Dr. R. B. Saltonstall,
The Udylite Company, Detroit, Michigan

THERE are several methods now in use for the determination of chromic acid and trivalent chromium in chromium plating solutions. They are:

1. From specific gravity by means of hydrometer.
2. Potassium iodide—sodium thiosulphate titration.
3. Ferrous sulphate — permanganate titration.
4. Direct titration with ferrous sulphate — potentiometric end point.

The accuracy of the hydrometer method is limited especially in old solutions which contain appreciable quantities of trivalent chromium and iron, which have some effect on the density of the solution. The hydrometer should be used only to detect large changes in concentration, such as might be caused by water leaking into the solution, or overflows.

Method No. 2 is based on the liberation of free iodine from potassium iodide by the chromic acid and the titration of the iodine with sodium thiosulphate, using starch as an indicator. This method is accurate in new solutions, but if iron is present the end point fades and the result is high due to slow liberation of iodine by the iron. The effect of the iron may be minimized by the addition of ammonium fluoride to the sample but as the quantity of iron increases, the accuracy of this method decreases. Furthermore, thiosulphate is not always reliable from the standpoint of stability unless it is kept sterile.

Method No. 3 involves the addition of a measured excess of ferrous standard ammonium sulphate solution and a back titration of the excess with potassium permanganate. The potassium permanganate solution has a tendency to decompose slowly on standing in light and must be restandardized rather frequently against a primary standard.

Method No. 4 consists of a direct titration of the chromic acid with standard ferrous sulphate, using a potentiometer with calomel and bright platinum electrodes for detecting the end point. The cost of this equipment is very often beyond the reach of many of the smaller laboratories.

A method has been devised by the writer which is similar to No. 4, the difference lying in the method of detecting the end point of the titration. It is an adaptation of a method for the determination of chromium in chromite originated by Smith, McVickers and Sullivan. A new indicator, ortho-phenanthroline — ferrous complex is used in place of the potentiometer, and a very stable oxidizing solution, ceric ammonium sulphate or ceric sulphate is used as a reference standard.

Potassium dichromate is used for a primary standard. A solution of ceric ammonium sulphate is standardized against the potassium dichromate by means of ferrous ammonium sulphate. This standardization is necessary only about twice a year, as ceric ammonium sulphate solutions have proven very stable over long periods of time.

In the analysis of the samples of chromium plating solution, a sample of the standard ceric ammonium sulphate solution is titrated at the same time, thus establishing the normality of the ferrous ammonium sulphate solution. As there is no back titration, the calculations are simple.

Solutions Required

(1) Distilled water should be used in preparation of all solutions and for making dilutions.

1. Potassium dichromate, exactly N/10.

   This solution may be prepared by dissolving exactly 4.9033 g. of C.P. Analytical Reagent grade potassium dichromate in water and diluting in a volumetric flask to exactly one liter.

   If the purest salt is not available, less pure materials may be purified by dissolving it in hot water to form a saturated solution and filtering while still hot. Allow to cool and filter off the crystals. Fuse them in a porcelain dish and allow to cool. Weigh out 4.0933 g. of the fused crystals, dissolve, and dilute to 1 liter as above.
2. Ceric sulphate, approx. N/10.

(2) Ceric salts and ortho-phenanthroline ferrous indicator may be obtained from the G. Frederic Smith Chemical Company, Columbus, Ohio.

   Carefully add, with stirring, 75 ml. of concentrated sulphuric acid to about 750 ml. of water and cool. Dissolve about 62 grams of crystalline C.P. ceric ammonium sulphate or 34 grams of anhydrous C.P. ceric sulphate in this acid solution, filter if not clear, and dilute to 1 liter with water.
3. Ferrous ammonium sulphate solution, approx. N/10.

   Carefully add, with stirring, 10 ml. of concentrated C.P. sulphuric acid to about 750 ml. of water. Dissolve about 39 grams of crystalline C.P. ferrous ammonium sulphate in this acid solution and dilute to 1 liter with water.
4. Manganous sulphate solution, 10 g/1. of C.P. $MnSO_4.4H_2O$.
5. Silver nitrate solution appr. N/10, 17 g/1 C.P. $AgNO_3$. Keep in dark bottle.
6. Ammonium Persulphate solution, 5 g/50 ml. C.P. $(NH_4)_2S_2O_8$ Must be made up fresh just before using.
7. Hydrochloric acid, 25% by volume of C.P. acid.
8. Ortho - phenanthroline - ferrous complex indicator solution(2).

Procedure

A. Standardization of ceric sulphate solution.

1. Pipette two 25 ml. portions of ferrous ammonium sulphate solution (approx. N/10) into separate 250 ml. Erlenmeyer flasks.

2. Add about 125 ml. of water and 5 ml. of conc. sulphuric acid to each flask.
3. Add one drop of ortho-phenanthroline indicator.
4. Add N/10 potassium dichromate solution from a burette until the pink solution just changes to a pale green. This is the end point.
5. Pipette two 25 ml. portions of ceric sulphate solution $Ce(SO_4)_2$ (approx. N/10) into 250 ml. Erlenmeyer flasks.
6. Add about 125 ml. of distilled water and 5 ml. of conc. sulphuric acid to each flask.
7. Add one drop of ortho-phenanthroline indicator.
8. Add ferrous ammonium sulphate solution (approx. N/10) from a burette. The yellow color fades as the titration proceeds and at the end point the change is from colorless to pink.

Calculation:

Take the average of the volumes of $K_2Cr_2O_7$ used in "4" and of the volumes of $Fe(NH_4)_2(SO_4)_2$ used in "8" and use these averages in the following equation.

Normality of $Ce(SO_4)_2$ = aver. ml. of $Fe(NH_4)_2(SO_4)_2 \times$ aver. ml. of $K_2Cr_2O_7 \times .00016$.

The value obtained for the normality of ceric sulphate should be recorded on the bottle, as it is used every time a sample of chromium plating solution is analyzed. This solution should be standardized by the above method about every six months.

B. Determination of chromic acid in plating solution:

1. Dilute 5 ml. of the chromium plating solution to 100 ml. in a volumetric flask and mix thoroughly.
2. Pipette 5 ml. of the diluted sample into 250 ml. Erlenmeyer flask, add 100-150 ml. of water and 2-4 ml. of conc. C.P. sulphuric acid.
3. Add 1 drop of ortho-phenanthroline indicator solution.
4. Add ferrous ammonium sulphate solution from a burette. The color changes slowly from reddish yellow to light green and at the end-point the color changes sharply from light green to pink or violet. Record the volume of ferrous ammonium sulphate used.
5. Pipette 10 ml. of standard ceric sulphate solution into a 250 ml. Erlenmeyer flask.
6. Add 100-150 ml. of water and 2-4 ml. of conc. sulphuric acid.
7. Add 1 drop of ortho-phenanthroline indicator.
8. Add ferrous ammonium sulphate solution from a burette until the color changes sharply from colorless to pink. This is the end point. Record the volume of ferrous ammonium sulphate used.
9. Only one sample of ceric sulphate solution need be titrated each time a number of chromium solutions are analyzed. This sample should be measured out and titrated along with the samples of chromium plating solutions to save time.

Calculations:

[Normality of $Ce(SO_4)_2 \times$ ml. of $Fe(NH_4)_2(SO_4)_2$ used in "4"] $\div$ [ml. of $Fe(NH_4)_2(SO_4)_2$ used in "8"] $\times 179 = CrO_3$ oz/gal.

C. Determination of trivalent chromium in plating solution.

1. Pipette 5 ml. of the diluted sample of chromium plating solution (prepared in B-1) into a 250 ml. Erlenmeyer flask.
2. Add 100 ml. of water, 10 ml. of concentrated sulphuric acid and 5 drops of manganous sulphate solution.
3. Add several ⅛-¼ in. glass

beads and heat the solution to boiling.

4. Add 2 ml. of silver nitrate solution (N/10) and 20 ml. of freshly prepared ammonium persulphate solution.
5. If a violet color is not formed add more ammonium persulphate solution until the color is seen. Boil for 10 minutes, add 5 ml. of 25% hydrocholric acid and continue boiling until the violet color disappears.
6. Cool to room temperature, add 1 drop of ortho-phenanthroline indicator and titrate with ferrous ammonium sulphate as in B-8.

Calculation:

[Normality of $Ce(SO_4)_2$ × ml. $Fe(NH_4)_2(SO_4)_2$ used in C-6] ÷ [ml. $Fe(NH_4)_2(SO_4)_2$ used in B-8] = total CrO_3 (oz/gal.) in solution after oxidation.

Subtract from this value the CrO_3 (oz/gal.) obtained in B and multiply the difference by .52. This gives the trivalent chromium content of the solution in oz/gal.

Note.—Either ceric sulphate or ceric ammonium sulphate solutions of the same concentration may be used. For brevity, the name of the single salt is used throughout the procedure.

Chrome-Plating Side Rods for Locomotives

(Continued from page 24)

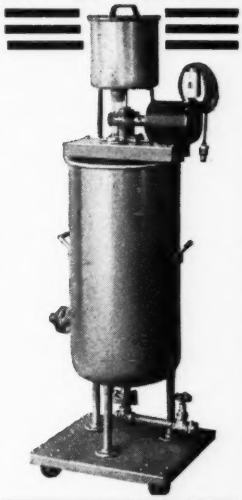
A 7½ H.P. exhaust system capable of handling 12,000 cubic feet of air per minute was installed in connection with this new tank and duplicated for the other tanks to eliminate the possibility of fumes. Provision is made for salvaging chromic acid from the fumes by washing them as they pass through the exhaust system.

Automatic Filter Powder Feeder & Mixer

Feeds and mixes measured amounts of HYFLO FILTER POWDER into plating solution while filtering to obtain fine filtration and maintain a fast flow rate over a long cycle before filter requires cleaning. Various solutions and numerous tanks can be handled with one portable unit in connection with any type of filter being used.

It is very important that HYFLO FILTER POWDER be used in filtering. On many operations it can be used simply by mixing into solution by hand. Recommendations on your requirement gladly furnished on request.

Also write for complete information regarding: INDUSTRIAL PRESSURE FILTERS for plating solutions, Cleaners, Solvents, Oils, Lacquer, Etc.



Industrial Filter & Pump Mfg. Co.

1030 W. NORTH AVE. CHICAGO, ILL.

Glass Lining Can Be Sprayed Into Your Tank

By Bartlett West

GLASS has long been acknowledged a superior material for making of fluid containers, due to the fact that glass is absolutely non-absorbent, acid-resisting, and practically immune to deterioration. As a substance, glass is as permanent as the sand from which it is made. Nothing that comes into contact with glass — except heat and hydrofluoric acid—either affects it or is affected by it, consequently it is the ideal substance from which to fashion containers for many kinds of liquids.

The use of glass has been restricted, however, due to the difficulty of fashioning glass into vessels of large volume. There are instances of glass being formed into linings for milk tanks and other similar applications, but the difficulties and expense have precluded such use on the widest scale.

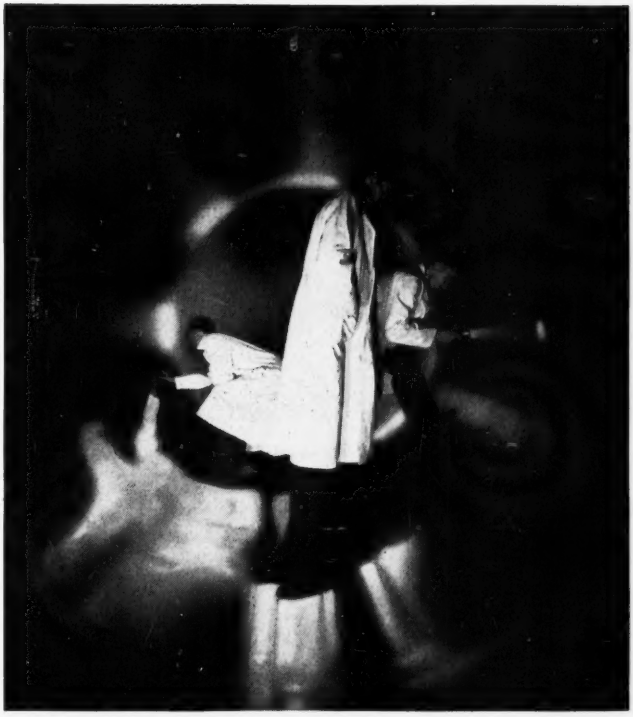
At last, however, modern science has given birth to a new product — glass in the form of a heavy viscous liquid which has all the virtues of glass but which can be applied as a lining to tanks of wood or metal with the ease with which a coat of lacquer is applied to an automobile body or a piece of furniture. This liquid synthetic glass is known as "Lastiglas" and its development is the result of three years of intensive laboratory experimentation and research in the laboratories of the Bishopric Products Company, Inc., Cincinnati, Ohio.

Lastiglas provides a smooth, glossy surface that is easy to clean and is permanent. One of its principal advantages, however, consists in that it is sufficiently elastic so that, to a certain degree, it can be bent with the base material to which it is bonded without cracking. Thus it will expand or contract with its base under changes of temperature without being damaged in any way.

Lastiglas can be applied to the

The Lastiglas is sprayed onto the inner surface of the tank, then is heat-tempered. When finished, it has all the non-absorbent, acid-resistant qualities of glass.

surface of any type of old or new steel tank, regardless of the shape. The base surface must be prepared, however, by blasting it by a special process so that a perfect bond will be insured. Applied as a liquid, the Lastiglas is sprayed onto the base surface, fusing with the steel as though welded. Layer after layer of this liquid glass is applied until the lining has been built up to the required thickness. After the last coat has been applied, and while the glass lining is still in a plastic state, the entire coating is subjected to a "heat tempering" process which fuses the coatings into a single solid vitreous sheet. The lining is now ready for use. It will neither decompose nor oxidize, nor will it yield to the action of solvents, alcohol, or acid solutions.



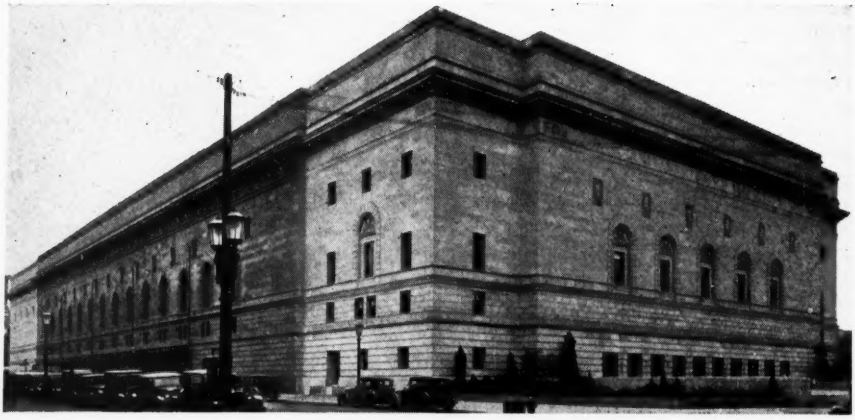
Inspecting the inner surface of a large tank after lining with Lastiglas.

The process of applying a "Lastiglas" lining to an average-size tank, such as, for instance, a tank 6 ft. diameter by 6 ft. deep, requires approximately three days from start to finish. However, when a number of tanks in close proximity are to be lined, after once getting under way the tanks can be processed at a rate of approximately one tank per day.

Upon completion of a "lining" job, the tank is allowed to stand until thoroughly cold, then the lining is carefully inspected to make sure that there are no imperfections. After the inspection the tank is washed out and is then ready to receive the beer, acid, liquor, or whatever else is to be put into it.

The potential field for the application of Lastiglas as a tank lining in the chemical, process industries, brewing, distilling, dairy and countless other industries is practically unlimited.

CINCINNATI ELECTRICAL TOOL CATALOGUE. The complete line of Cincinnati Electric Drills, Grinders, Buffers, and Portable Tools is illustrated and described in a 40 page catalog being issued by The Cincinnati Electrical Tool Co., Cincinnati, Ohio. Free upon request.



Cleveland Public Auditorium

NATIONAL METAL SHOW

Four acres of floor space devoted to modern developments in the field of metals.

THE nineteenth National Metal Exposition will be held at the Public Auditorium in Cleveland, Ohio, from October 19 to 23 inclusive. For the past eighteen years this annual industrial exposition has been staged and sponsored by the American Society for Metals. This year the following four societies are cooperating: American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Welding Society, and The Wire Association.

The National Metal Show will be the one important exposition of the year to engineers, manufacturers, plant executives, and others in vocations that are allied with metal manufacturing. At the time of going to press, space has been contracted for by 210 manufacturers, the space contracted for amounting to 169,000 square feet, or nearly four acres. Among these 210 exhibits the visitor to the Exposition will find demonstrations of various kinds and types of new products along the line of metals or alloys, laboratory equipment, modern metal-working machinery, the latest welding equipment, various types and kinds of ovens and furnaces, and other interesting developments.

The list of exhibitors includes the following firms:

Acme Steel Co.
Chicago, Ill.
Booth No. M-9

Aetna Gases, Inc.
Detroit, Mich.
Booth No. N-46

Air Reduction Sales Co.
New York, N. Y.
Booth No. G-7

Ajax Electric Co.
Philadelphia, Pa.
Booth No. A-3

Ajax Electrothermic Corporation
Trenton, N. J.
Booth No. A-3

Allegheny Steel Company
Brackenridge, Pa.
Booth No. C-22

Edgar Allen Steel Co., Inc.
New York, N. Y.
Booth No. D-22

Aluminum Co. of America
New Kensington, Pa.
Booths Nos. I-23 and I-27

The American Brass Company
Waterbury, Conn.
Booth No. C-21

American Car & Foundry Company
New York, N. Y.
Booth No. E-32

American Cyanamid & Chemical Corp.
New York, N. Y.
Booth No. N-47

American Elec. Furnace Co.
Boston, Mass.
Booth No. I-4

American Foundry Equipment Co.
Mishawaka, Ind.
Booth No. M-48

American Gas Association
New York, N. Y.
Gas Section

American Gas Furnace Co.
Elizabeth, N. J.
Gas Section

American Institute of Mining & Metallurgical Engineers
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DESPATCH CONTINUOUS CONVEYOR OVENS. The Despatch Oven Company, 622 Ninth St., S. E., Minneapolis, Minn., has issued two bulletins describing some of the newest ovens which have been built by this firm for use in the manufacture of steel doors, bed springs, camp stoves, steel barrels, display cabinets, auto trunks, and so on. In each case the equipment is illustrated and is accompanied by detailed description. Copy free.

M & W Enamels

A new line of air-drying enamels, especially designed to prevent the corrosion of iron and steel in railroad, marine, mining, oil, and general industrial service, has been developed by Maas & Waldstein Co., Newark, N. J. These anti-corrosive enamels are made of rust-resisting pigments and a synthetic resin vehicle, and form a hard, tough coating that is resistant to wear and is of pleasing appearance. According to the manufacturer, exposure tests, conducted over a long period of time, show that they are particularly effective in providing protection from the corrosive action of humidity, salt water, alkali, and a variety of chemicals, and in preventing electrolytic action.

These new enamels can be applied either by brush or spray, and cover approximately 350 ft. per thinned gallon. They air-dry in four hours and harden overnight. Types for baking in one hour at 250 to 350 deg. F. can also be supplied. Available colors are brown, black, red, and a bronze liquid.

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Parker Rust-Proof Launches Zinc Bonderizing Process

New Process Prevents Corrosion and Holds Paint on Zinc Die-Castings and Galvanized Iron

BACK in 1915, when American manufacturers were just stepping into the new era of wartime prosperity, the Parker Rust-Proof Company launched the first completely successful chemical rust-proofing treatment for iron and steel. Almost overnight that treatment, known as Parkerizing, grew from a little known process to one of the most widely used in the automotive and industrial fields.

Thirteen years later, in 1928, Parker research engineers announced another Parker process—Bonderizing—that not only prevented rust on ferrous metals but also provided a bond for paint finishes. Today many of the essential working parts of practically all of the motor cars rolling off American production lines are Parkerized. Bonderizing for paint-coated sheet-metal parts is considered essential by the majority of automobile producers. Parker Processes protect bicycles, refrigerators, light fixtures, grave vaults, scales, electrical transformers and hundreds of other parts of products in the industrial and consumer goods fields.

Working behind closed doors, Parker researchers in Detroit have been testing, experimenting and retesting a new Parker process. They have just made the announcement that they have perfected a new process and are satisfied with their tests. The new

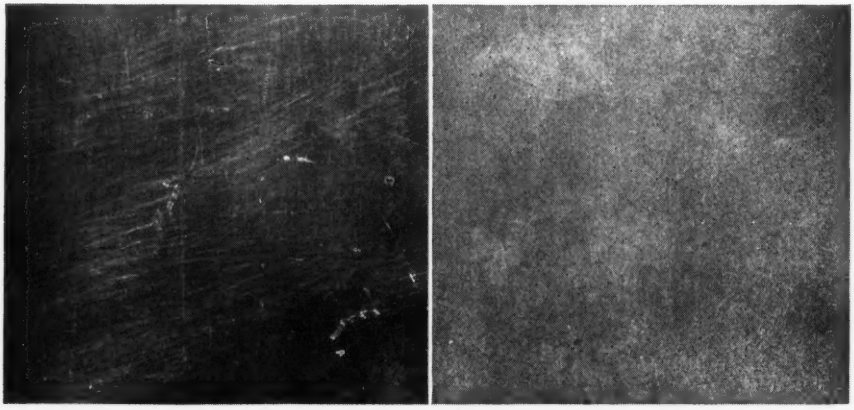


Fig. 1—(Left) Plain zinc surface as it appeared before Bonderizing. (Right) The same type of zinc surface, illustrating the surface change produced by Bonderizing.

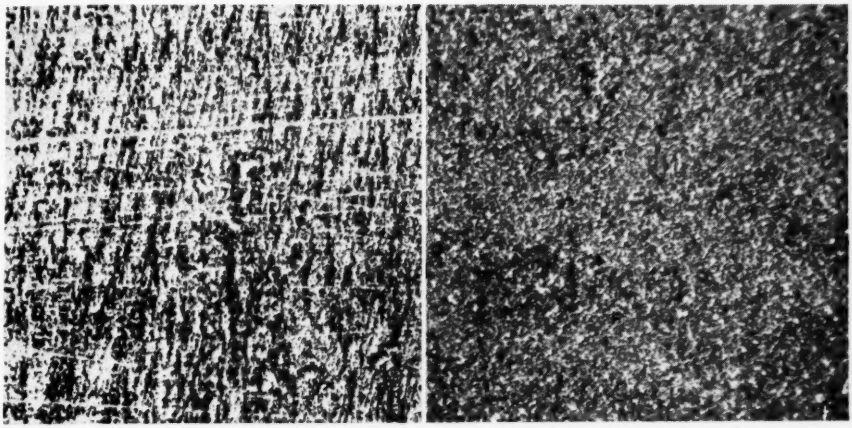


Fig. 2—(Left) Photomicrograph, enlargement 30 times, showing how the surface of untreated zinc appears under the microscope. (Right) Photomicrograph, enlargement 30 times, showing the surface change that takes place when zinc is Bonderized.

process is called Bonderite "Z". This latest Parker process prevents corrosion and stabilizes paint finishes on zinc-alloy die-castings and galvanized and galvanealed iron. Like the other now famous Parker processes, it is a low-cost, easily applied, chemical conversion process that both coats and alters the surface of the metal.

Opens New Opportunities for Industry

Metallurgists, designers, sales engineers and executives who have seen the results of tests with the new Bonderite "Z" process unite in agreeing that it will open the door to new sales opportunities and new markets for many manufacturers. And well might they agree on this score, as most manufacturers know zinc-die-castings have several important advantages. They require little or no machining and finishing. They can be more easily cast into intricate shapes. And usually they can be produced in quantities more economically.

Galvanized and galvanealed iron, too, have long been considered the ideal materials for countless stampings, linings and other parts or products that are to be subjected to long and hard use.

Nevertheless, these materials have been kept out of some markets because of corrosion difficulties and poor paint holding qualities. But now, with the development of the Bonderite "Z" process that prevents corrosion and gives them a substantial base for paint, zinc and galvanized iron can step into these markets. Bonderite "Z" greatly extends their already wide sales fields.

How Bonderite "Z" Works

Technically, Bonderite "Z" is a chemical conversion process. It converts the metal's smooth surface into an absorbent, paint-holding, crystalline structure and produces an insoluble phosphate salt coating that becomes an integral part of the metal itself.

Bonderite "Z" may be applied to zinc-alloy die-castings, stampings, forgings, and rolled or machined parts and galvanized or galvanealed parts of any size or shape. Its remarkable effectiveness is best demonstrated on parts having recesses,

depressions or internal threads. It contacts all surfaces equally, converts the metal, and deposits its protective coating in every crevice and corner. Because it is a chemical conversion process, and because it is applied at comparatively low temperatures, Bonderite "Z" does not change the size, shape or contour nor does it distort or warp the production treated.

trated liquid form which requires only the addition of water to prepare the working solution. A simple titration indicates the concentration of the processing solution which can easily be kept at the proper working strength by the addition of the concentrated Bonderite "Z" chemical.

The entire process, including chemicals, labor, and write-offs on equip-

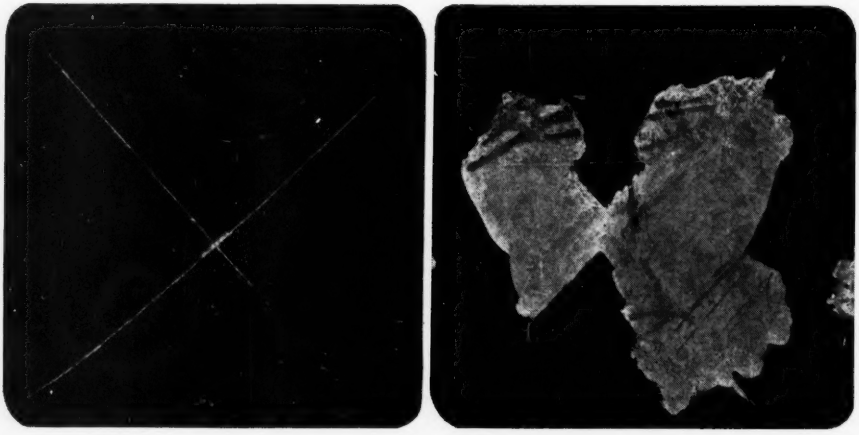


Fig. 3—(Left) Zinc panel finished with Bonderite "Z" and sprayed with a three-coat lacquer finish. The coating is still in good condition after testing in salt spray for 500 hours. (Right) Zinc panel identical with panel at left, except that it was not Bonderized before applying the lacquer. The finish has definitely failed.

Like Bonderite "B" and "X" and its other related processes Bonderite "Z" requires comparatively simple equipment, is easily applied, and is inexpensive. It requires no electric current. Besides ordinary cleaning and rinsing tanks, the only other equipment needed is a processing tank of sufficient size—and trays, baskets or hooks in sufficient quantity—to handle the daily production requirements.

Bonderite "Z" can be applied without expert supervision. Parts to be treated are simply cleaned, immersed in the processing tank one-half to three minutes, removed, rinsed and dried.

Bonderite "Z" comes in concen-

ment, adds but a fraction to the total cost of any product.

Tests Prove Effectiveness of Bonderizing

Day after day at the Parker Laboratories in Detroit, hundreds of Bonderized and non-Bonderized zinc-alloy die-castings and galvanized and galvanealed sheets—finished with nearly every kind and type of paint, enamel and laquer—are made to face relentless salt spray, humidity and adhesion tests. These "third degree" tests invariably reveal that whereas untreated bare zinc corrodes and the finish on untreated zinc fails, Bonderized surfaces retain their finish

and do not corrode.

The accompanying photographs illustrate these tests. Fig. 1 shows the change that comes over zinc when it is Bonderized. The sample at the left is untreated. Its surface is smooth, non-absorbent. It affords no adequate foothold for paint. It has no coating to guard against corrosion or to neutralize chemical action between the paint and the zinc.

The sample at the right in Figure 1 has been Bonderized. An insoluble phosphate coating has formed on the surface. Because this coating consists of millions of minute crystals, it provides a foundation for paint. Paint flows into the spaces between the crystals and when it hardens, securely anchors itself in place.

Figure 2 shows the same two samples as Figure 1, except they are enlarged 30 times thus defining more clearly the change that Bonderite "Z" produces.

Fig. 3 shows two pieces of zinc that were finished with three coats of lacquer, scratched and subjected to a salt spray for 500 hours. As can be noted, the finish on the Bonderized piece (left) came through the severe test practically intact, but the finish on the untreated piece (right) has obviously broken down.

The samples shown are typical. The same sort of tests, made on zinc in nearly every form and with nearly every type of paint system, show similar results.

New Process Available to All Manufacturers

Like the other Parker processes, Bonderite "Z" licenses will be awarded to manufacturers who wish to set up their own processing equipment; and complete Bonderite "Z" service will be available to small manufacturers and occasional users at the twenty-two Parker Jobbing Service Plants dotting the country from Boston to San Francisco.

A 12-page illustrated book, describing the new Bonderite "Z" process, will be sent on request by the Parker Rust-Proof Company, Detroit, Mich.

FABRICATION AND TREATMENT OF USS STAINLESS AND HEAT-RESISTING STEELS. Peter A. Frasse & Co., Inc., 17 Grand St., New York, N. Y., have published a new 42-page booklet on Fabrication and Treatment of USS Stainless and Heat Resisting Steels. A major service of the modern steel warehouse is that of its technical staff, which serves as a clearing house of information on new products, new applications and methods of fabrication and treatment in all types of steel.

The new booklet contains a summary of the latest information on the fabrication and treatment of USS Stainless Steels, carefully indexed, and is designed not only for general information but as a practical help to the engineer and shop foreman. Copy free upon request.

FACTS ABOUT METAL POLISHING

Users of abrasives will be interested in this book which has just been issued by the Norton Company, Worcester, Mass. Among the subjects covered, as evidenced by the chapter headings, are: Physical Properties Required in Abrasive Grain; Preparation of Glue; Setting Up Polishing Wheels; Correct Drying; Polishing Different Metals. The book also includes a table of recommended grain sizes for various types and kinds of work. Copy free upon request.

Bright Zinc Plating Finish Produced by "Mazic" Process

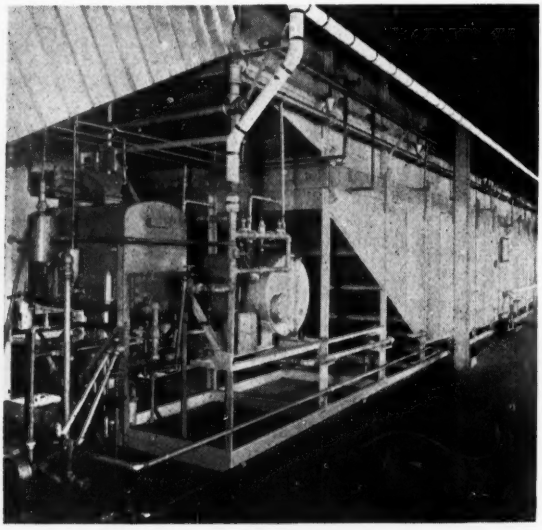
Zinc is claimed by some manufacturers to afford first-class protection against rust. The wide application of zinc plating has, however, been delayed by lack of a plating method which would produce a bright, rather than white, finish and which would be easy to maintain.

The "Mazic Process" of bright zinc plating which has been developed by the Hanson-Van Winkle-Munning Co. of Matawan, N. J., permits heavy deposits from a cyanide solution and is said to give satisfactory results in steel tank, semi-automatic and full automatic plating systems. The plate is truly bright and is said to compare favorably with the best cadmium finishes.

What's New in Equipment and Materials

Detrex Degreasing Machine

The illustration shows what is said to be the largest degreasing machine in use in this country. The machine, a product of the Detroit Rex Products Co., 13005 Hillview Ave., Detroit, Mich,, is now a part of the equipment of the Dodge Division of the Chrysler Corporation. Fenders and sheet metal parts are degreased in this equipment before being bonderized. The parts to be cleaned are carried through the heavy vapor of chlorinated organic solvent which rapidly condenses on the metal surfaces and, in flowing off, carries all oil and grease with it.



Detrex Degreasing Machine

The Detrex Degreasing Machine is served by two Monorail Conveyors, each carrying a continuous stream of metal parts at a speed of approximately 20 ft. per minute through the vapor. All cleaning is automatic with a normal production of 17,000 lbs. per hour and a peak production of 60,000 lbs. per hour. The machine itself is 65 ft. 5 in. long, 10 ft. 5 in. wide, and 19 ft. 4 3/16 in. high.

The vapor line in this Detrex Degreaser stands about 8 ft. above the floor and is controlled by a cold water condenser that condenses all vapors above that point, the condensate flowing back into the boiling chambers. While the machine is operating, the solvene is kept at a boiling temperature by means of steam coils running along the bottom of the boiling chamber. In addition to the degreasing machine itself, a still is used to reclaim dirty solvent at a rate of 50 gal. per hour. The machine itself automatically distills 250 gal. of solvent per hour

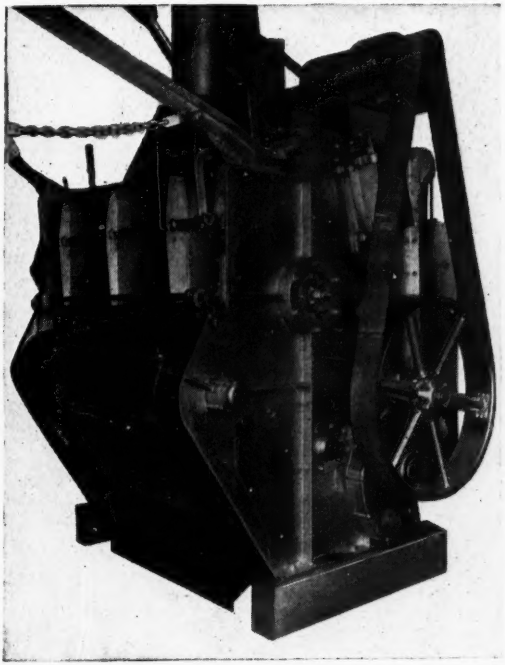
27x36-In. Wheelabrator Tum-Blast

A new small Wheelabrator unit designed especially for use in foundries shops and plants having a limited production, is announced by The American Foundry Equipment Company, 557 Byrkit Street, Mishawaka, Ind. The new Wheelabrator unit is installed in a new size Tum-Blast mill. While smaller in size, this mill has all the desirable features which are responsible for the international popularity of the larger Wheelabrator Tum-Blast.

Material to be cleaned is loaded directly onto the apron conveyor. When the mechanism is set in operation the action of the conveyor apron cascades the individual castings, over and over, directly under the blasting area, assuring complete coverage at all times. In unloading, the movement of the conveyor is reversed, allowing cleaned products to spill into waiting receptacles under the machine.

Centrifugal force replaces compressed air as a driving agent in whipping abrasive onto the work to be cleaned in the Wheelabrator. Abrasive is fed by gravity from an overhead storage bin in the center of the Wheelabrator. After blast-

ing, it drops through holes in the conveyor plates into a hopper below where refuse is automatically screened out. Cleaned abrasive drops into the boot of



27x36-In. Wheelabrator Tum-Blast

a bucket elevator and is lifted to an overhead storage hopper for reuse. Steel grit or shot may be used over and over. Dust is carried out of the Tum-Blast by the American Dustube Collector operated in conjunction with the machine. The abrasive cycle used in Wheelabrating is constant until the machine is shut off for loading or unloading.

Many new developments are incorporated in the construction of the unit. The door is counterweighted for easy operation. It swings up and provides an unobstructed opening for loading and unloading. It is completely equipped with dust seals. The apron conveyor can be provided with either overlap or flat type slats, depending on the type of material to be cleaned. Both slats are furnished with heavy-duty reinforcing channels.

Having an operating load capacity of five cubic feet, the 27x36-in. Wheelabrator Tum-Blast answers the need of manufacturers with a limited production for automatic cleaning equipment which is both economical in operation and maintenance.

Hammond Automatic Polishing and Buffing Machine

An automatic polishing and buffing machine built in two types and five models ranging from ½ to 3 h.p. has been announced by the Hammond Machinery Builders, Inc., Kalamazoo, Mich. The ½ h.p. and 1 h.p. sizes—to be known as the JR models—are especially adapted to the speedy handling of light, flat work, such as link pin heads, screw heads, and similar small parts. The 1½, 2 and 3 h.p. sizes — to be known as the JRH models—are designed for handling small die castings, small gears, door knobs, lock parts, light brass parts and other circular work up to 5-in. diameter.

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The Pioneer builder of Automatic Polishing and Buffing Machines. **SEND SAMPLE** Part and Finish for Proposal.

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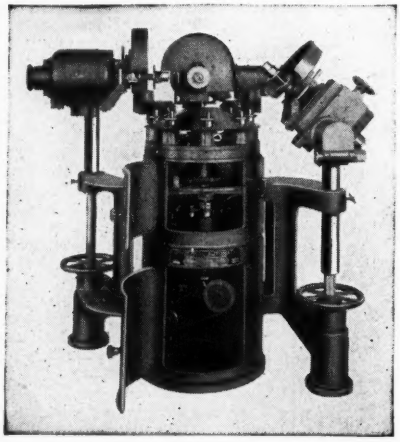
CUT YOUR FINISHING HOUR COST *while you* **INCREASE PRODUCTION.** *the answer* **PACKERS**

The manufacturer states that production on these machines is limited only by the skill and dexterity of the operator,



Hammond Automatic Polishing and Buffing Machine

a production as high as 1800 pieces per hour being possible.

The Geneva-rotated work table has eight revolving work spindles which are connected by chain sprocket drives to a ball bearing worm gear reducing unit which is operated by V belt drive from a motor in the base. This drive permits regulation of indexing and work rotating speeds to meet prevailing conditions. The work table and all shafts and spindles are mounted on dust-proof, grease-sealed ball bearings. All motors are ball bearing and provided with overload protection controls.

The frame is massive and well-ribbed, provided with the necessary openings to permit of ready access to the operating mechanism. The Type JR motors are fitted with extended spindles held rigidly on columns in horizontal position with a handwheel vertical adjustment. The Type JRH motors have threaded spindle shafts mounted on cross slides with worm gear pivot action. The wheels are hooded and equipped with two-way exhaust heads for carrying off dust.

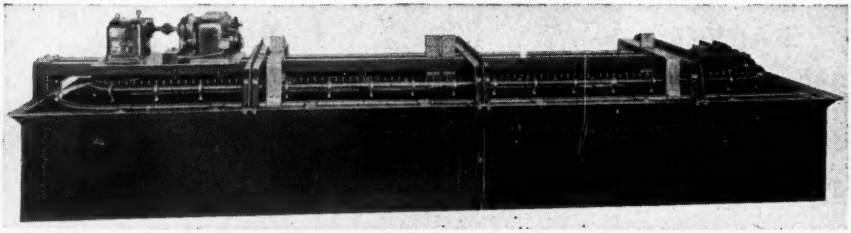
Udylite Semi-Automatic Plating Machine

The Udylite Company, 1651 East Grand Blvd., Detroit, Michigan, announces the development of a new semi-automatic plating machine. This machine is said to offer the advantages of better plating results, closer production regulation and lower plating costs. Construction of the new unit includes a number of improvements in design which contribute to lower operating cost and a minimum of maintenance expense.

Better plating results and a marked reduction of rejects are effected because each piece being plated is subjected to identical plating conditions: i.e., plating time, current density, etc. Therefore, the machine can be set and work plated to the desired thickness specification is produced.

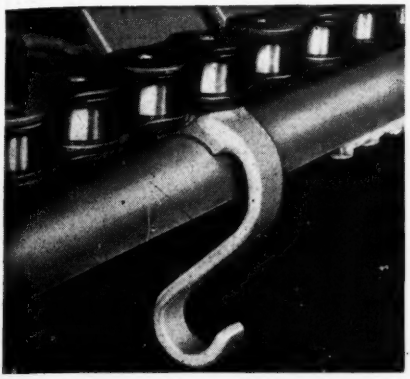
Production can be regulated within very close limits. The work racks are hung on the chain conveyor and are carried away from and brought to the operator at a definite rate of speed. This results in a continuous uninterrupted flow of production which in turn means a saving in labor. Any desired speed between 1 and 4 ft. per min., is obtainable.

In addition to money saving through reduction of rejects and closer production regulation, the Udylite Semi-Automatic effects still further savings in that one man can do the work of two or possibly three with several still tanks.



Side view of 18 ft. Udylite semi-automatic plating machine. Drive mechanism is mounted on common bed plate (left) to preserve proper alignment. At right is the loading end.

In the construction of the Udylite Semi-automatic, attention has been paid to simplicity, compactness and durability. Design features include strong structural steel chassis, new, simplified chain-hook combination, alloy steel chain with breaking strength exceeding 5 tons, and cut tooth drive sprockets. The machine is equipped throughout with ball and roller bearings which need lubrication but once every six months. Hooks are designed for heavy loads. The Udylite Semi-Automatic is made in a wide variety of sizes to conform to the individual plating problem.



Close-up of chain-cathode hook combination. Chain is directly engaged to hook and exerts direct pull which results in smooth operation.

Binks Portable Paint Sprayer

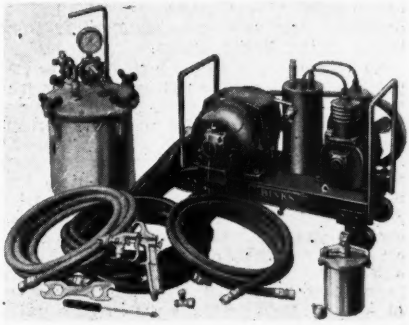
Development of a rubber tired portable paint spraying unit, adaptable for both interior and exterior painting and for light duty touch-up and refinishing work, has been announced by the Binks Mfg. Co., 3114 Carroll avenue, Chicago, Ill. The unit was designed to fit needs of master painters, decorators, building contractors, and others, for a medium size painting outfit for maintenance work on furniture and equipment in factories, theaters, hotels, schools, hospitals, railroads and residences. In addition, it is said to provide a faster painting method for service repair departments of refrigerator, radio, automotive and furniture manufacturers.

Mounted on a wheeled base, the unit consists of a ½ h.p. electric motor, an air compressor unit, a two gallon capacity pressure tank, a standard Binks bleeder type spray gun with adjustable nozzle, and various lengths of rubber hose. Complete, the outfit weighs only 180 pounds.

The spray gun furnished with the unit is a Binks Thor Model 6B gun, recommended for touch-up and fine finish work. An alternate spray gun with a flat nozzle or round and angle spray can be used for maintenance work. The compressor unit is of two-cylinder, air-cooled type, with a bore of 2¼ in. and a stroke of 1¾ in. It has a working pressure of 45 lbs. and is driven by a V-belt from the electric motor. The air chamber is equipped with a drain cock and safety valve set at 60 lbs. pressure. The chamber serves as an oil and water extractor, also.

The pressure tank is equipped with one air pressure regulator and gauge, and a safety valve set for 60 lbs. pressure. Three lengths and types of hose are provided, including a 25 foot length of air hose from the compressor to the tank, a 12 foot length of ½ in. air hose from the tank to the gun and a similar length of ⅜ in. material hose and connections to go from the tank to the gun.

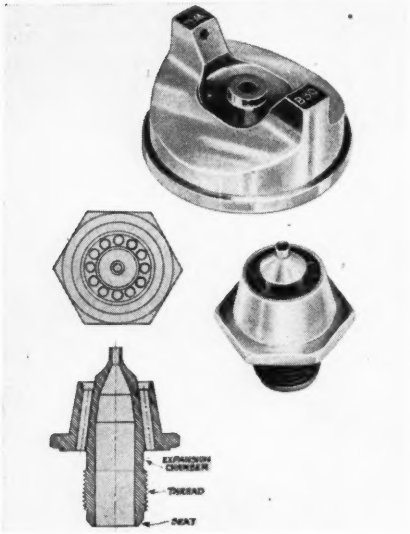
A ½ h.p. gasoline motor may be used where electricity is not available for painting farm buildings, railroad buildings and equipment for city, state, and federal maintenance work.



Binks Portable Paint Sprayer

Milburn Announces Improvements In Fluid Nozzles and Atomizer Heads For Paint Spraying Equipment

The Paint Spray Equipment Division of the Alexander Milburn Company, 1493 W. Baltimore St., Baltimore, Md.,



Milburn Fluid Nozzle and Atomizer Head

announces major improvements in atomizer heads and fluid nozzles for their latest Paint Spray Guns.

The fluid nozzle is of a materially improved design and incorporates features which make it a more efficient and economical unit for spraying various materials. It is made of a special grade, wear-resisting steel with unusually long tapered seat, accurately machined and burnished for perfect alignment with atomizer head. Generous air passages, closely spaced, provide a large annular air supply to atomizer head resulting in a perfectly atomized spray. The internal tapered seat is finished to exacting specifications allowing the paint needle point to seat accurately and prevent dripping or spattering. One particular feature is that the nozzle seats on the base of the thread of the head which keeps paint or other material entirely out of the threads eliminating the usual clogging common to most spray guns.

The bronze atomizer head is of simple, one piece design, precision made with straight air passages eliminating friction and rendering it easy to clean. Perfect alignment of seats is assured. Ample air requirements are provided by large non-frictional air passages and expansion chambers which increase the velocity and volume and are said to produce very fine atomization at lower pressures.

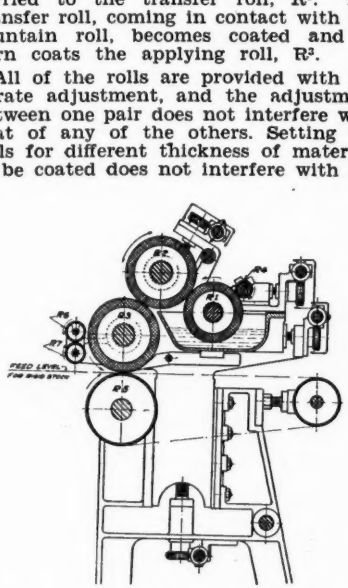
These new fluid nozzles and atomizer heads are manufactured for siphon or force feed and in sizes and styles to handle any type of material from the finest lacquer to the heaviest synthetic enamel.

Francis Model T-R Coating Machine for Sheet Stock

A machine wherein a uniform film of paint or other finishing material can be automatically applied to rigid or flexible sheet stock (flat or curved) has been developed by the Chas. E. Francis Co., Rushville, Ind. It is called the Francis Model T-R Coating Machine. The arrangement of rolls provides for exceptionally close regulation.

Referring to the accompanying cross-sectional drawing, the foundation roll, R^1, turns in a bath of paint, picking up an excessive amount. The doctor roll, R^4, is adjusted to regulate the amount of paint on the foundation roll, to be carried to the transfer roll, R^2. The transfer roll, coming in contact with the fountain roll, becomes coated and in turn coats the applying roll, R^3.

All of the rolls are provided with accurate adjustment, and the adjustment between one pair does not interfere with that of any of the others. Setting the rolls for different thickness of materials to be coated does not interfere with the



Francis Model T-R Coating Machine for Sheet Stock

coating adjustment, as the whole group of rolls above the feed line is adjustable as a unit.

Rigid materials, such as plywood pan-

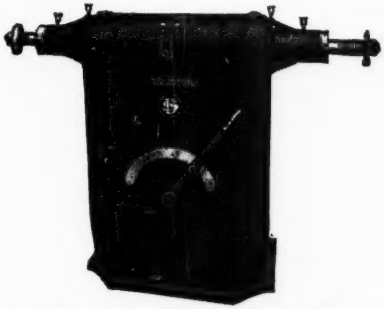
els or sheet metal, are fed directly between the coating roll, R^3 and the feed roll, R^5, but an extra pair of nip rolls, R^6 and R^7, is furnished for thin flexible materials such as paper, leather and fabrics, so that it is not necessary to adjust the nip between the regular feed roll and the coating roll so close that the feed roll or belt might become coated.

Rolls can be furnished in any metal, or covered with rubber, synthetic rubber, or gelatin for coating with paint, varnish, lacquer, enamel, or other materials. The direction of rotation of the transfer roll R^2 can be reversed so that a more varied degree of coating can be had.

U. S. Model 95 Multi-Speed Buffer and Polisher

The United States Electrical Tool Company, 2471 W. 6th St., Cincinnati, Ohio, has brought out a multi-speed buffer and polisher to be known as the U. S. Model 95. The U. S. Model 95 is said to solve an important problem in the plating industry, particularly in the ever-increasing alternating current districts. Because of the standards in the plating industry, it has been desirable to use speeds on buffing which are not available in directly connected units of A.C. of standard cycle. The U. S. Model 95 Buffer is said to solve this problem by providing a selective gear drive.

The machine is simple in design, positive in action, and flexible in speed. Four wheel speeds from 2000 to 3000 r.p.m. are provided, or any range desired. The speeds can be changed in just a few seconds by the speed lever mounted

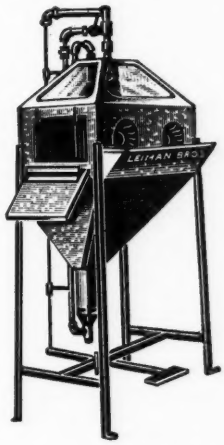


U. S. Model 95 Multi-Speed Buffer and Polisher

on the front of the machine. The buffer is also obtainable as a grinder in the U. S. Model 64 and 65.

Leiman Bros. Continuous Feed Sand Blast

The illustration shows a continuous feed sand blast machine that has been placed on the market by Leiman Bros., Inc., 150 Christie St., Newark, N. J. The



Leiman Bros. Continuous Feed Sand Blast

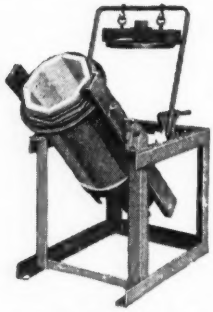
machine is intended for the sand blasting of comparatively small work and is of simple construction. The machine can be supplied with cabinets 24x60, 30x36, 18x24, or 10x12 in. in size. The sand is fed into a pipe in the top of the machine, and the speed of the blast is regulated by a foot lever, giving the operator the use of both hands for manipulating the work. Two openings for the operator's hands are provided at the front of the machine, each opening having cloth cuffs which fit tightly around the wrists. Work is admitted through a large opening in the side of the machine, and glass panels in the sloping sides at the top admit light and make it possible for the operator to see what he is doing.

A metal apron is provided at the front of the machine to catch sand when removing the hands from the cuffs. A wire screen forms a floor upon which the articles are caught when dropped from the hands. A small door at the bottom may be opened to recover any article which may find its way to the bottom of the machine, thus precluding necessity of taking the piping apart. Enough sand for many days use is held in the compartment at the bottom of

the machine, as the sand is used over and over again automatically. The piping system employed consists of standard pipe iron and fittings which can easily be procured should they require renewal at any time. No suction fan is needed to carry off dust, as all the dust is confined inside of the cabinet.

Mercil Type Burnishing Barrel

Several exclusive features mark the Mercil Type Burnishing Barrel developed



Mercil Type Burnishing Barrel

by Hanson-Van Winkle-Munning Co., Matawan, N. J.

Extensive use of electro-welding and the use of anti-friction bearings throughout make possible a machine combining lightness, strength and durability. The burnishing barrel proper, gearing and motor are combined into a single unit. Operation at any angle is quiet and efficient and the angle may be changed while the machine is running. Motor, gears and most of the cylinder are covered by a steel shell making the apparatus splash-proof. Safety guards are unnecessary with this machine.

Operation is exceedingly simple. A motor control switch is mounted on the front of the frame. Notched plates on the right hand trunnion bearing lock the barrel at the desired angle. A unique cover lifting device and support facilitate handling the machine and the work

MSA Abrasive Mask

The MSA Abrasive Mask, a recent development of the MSA Dust Research Laboratories, has been announced by the Mine Safety Appliances Company, Pittsburgh, Pa. The mask is a lightweight, comfortable unit, capable of giving complete protection to the wearer from the heavy concentrations of fine dust present in shot and sand-blasting rooms

It is sturdily constructed and able to withstand the impact of high-velocity abrasives. The protective efficiency and durability of the MSA Abrasive Mask has been thoroughly tested and proved by months of service on both shot and sand-blasting work.

Air is fed into the facepiece through a corrugated rubber tube which permits free movement of the head. The incoming air enters the lower part of the face-piece and passes out through double exhalation valves, whose extremely low resistance to the air flow permits low pressure in the facepiece and assures an ample supply of air.

A latex-covered silk hood which is extremely low in weight, tough and resilient to the high-velocity impact of the abrasive particles, fits neatly over the head and shoulders of the operator and fastens at his waist, exposing only the lens section of the facepiece.

The air passing out the exhalation valves from the mask serves to inflate the hood slightly, providing an aircushioning effect which increases the natural resistance of the fabric to the wearing action of the shot or sand. The hood is removable and replaceable, being attached to the facepiece with readily-opened fasteners.

The mask has a flow control valve with a "bump-proof" adjustment. The setting cannot be changed accidentally, since the handle is normally held in a released or "free-wheeling" position by means of a spring which must be pushed in by the operator to an engaged position and then turned to change the flow of air.

In the event the air supply should fail, or become unusable, for any reason,

MSA Abrasive Mask

a lever extending over the air-supply nipple of the flow control valve immediately detaches the mask from the air line when pulled upward by the operator. This enables the operator to break his connection and breathe through the filter on the free end of the corrugated tube, and leave the confined space.

If desired, a replaceable charcoal cartridge filter can be provided to remove objectionable odors and foreign matter such as dirt and oil from the incoming air for the further protection of the operator.

"Grainlock" Water Soluble Cement

A cement for use in setting up polishing wheels which, according to the manufacturer, hardens rather than softens under heat and which requires no cooking, has been placed on the market by Industrial Lubricants Co., 5734 12th St., Detroit, Mich. This cement, which is known as "Grainlock", is a water soluble cement which has been chemically treated to lessen the surface tension and make it more penetrating in solution than ordinary water. It does not have to be heated to make it penetrate into the pores of abrasive grains, even though the grains may have been exposed to normal shop dust. It is intended to be used just as it comes—without thinner and without heating.

The manufacturer states that "Grainlock" cement holds the grain with maximum tenacity and the grain is said to shell off very slowly. The large number of pieces that can be polished with one wheel "set-up" mean less frequent wheel changes and more steady production by the use of comparatively few wheels.

The fact that "Grainlock" hardens rapidly under heat makes it possible to force-dry wheels and thus speed up the setting-up operation. A more important feature is the fact that friction heat generated in operation causes "Grainlock" to become brittle and fracture into small areas as the wheel runs and comes in contact with the work. Fresh cutting edges of the grain are thus constantly being exposed to the work with the result that the cutting is more open. This is said to mean that a "Grainlock" set-up wheel has less tendency to clog when polishing soft metals, resulting in longer service and less opportunity for scoring the work.

Hardening under heat is also said to reduce glazing to a minimum and thus prevent "wheel burn." Inasmuch as the cement does not soften under heat, it is impossible for the grains to sink into the glue. With the polishing grains maintained on a hard surface, the work cannot come in contact with the bonding agent and is thus prevented from discoloration. With no burning of the wheels, there are no burned wheels to repair.

Inasmuch as no cooking is necessary, the expense of cooking equipment is saved in addition to the floor space which otherwise would be necessary. The fast-drying quality of the cement reduces the number of drying racks required. The fast cutting action and high efficiency of the wheels set up with "Grainlock" reduces costs on polishing jobs.

A sample of "Grainlock" polishing wheel cement will be sent to any plant executive or polishing department foreman upon request.

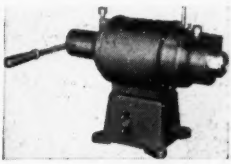
Industrial Automatic Filter Powder Feeder and Mixer

An automatic filter by the use of which measured amounts of "Hyflo Filter Powder" can be mixed and fed into plating solutions while filtering has been brought out by the Industrial Filter & Pump Mfg. Co., 1030 W. North Ave., Chicago, Ill. This machine can be used in connection with all makes of pressure filters now being used to filter plating solutions.

"Hyflo Filter Powder" is a silica of diatomaceous origin that facilitates the removal of suspended matter from the solution. It has been used advantageously by many platers during the past few years to obtain fine filtration, and maintains a fast flow rate over a long cycle before it is necessary to clean the filter. Platers who have been adding the filter powder and mixing by hand will find this automatic feeder and mixer a valuable addition.

This piece of equipment is powered by

IDEAL SPEED LATHES



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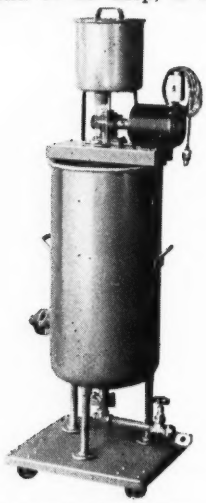
FINISHING
POLISHING
SMALL PARTS

2 Speed Motor. Automatic Brake. Collet or 3 Jaw Chucks. Hand operated or automatic. Write for Cir. 351.

SCHAUER MACHINE CO.
903 Broadway Cincinnati, Ohio

a ¼ h.p. motor with an overload fused switch. The mixing tank, 18 in. in diameter and 36 in. deep, is lined with



Industrial Automatic Filter Powder Feeder and Mixer

pure sheet lead with hard lead lined fittings and hard lead valves. For cyanide solutions, tanks of plain steel with iron valves and fittings are available. The hopper for powder is 12 in. deep and 12 in. in diameter and has an inside regulator for adjustment of feed. A 15-ft. cord and plug are furnished as standard equipment.

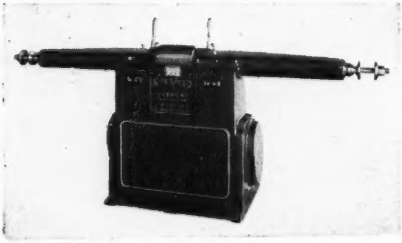
Hammond Automobile Fender Polishing Lathes

The Hammond Machinery Builders Inc., Kalamazoo, Michigan, announce a new line of polishing lathes specially designed for automobile fender polishing and other work of a similar nature.

The accompanying illustrations show two of the most popular models, several of which have been recently installed in some of the larger automobile shops.

The Hammond Model RR Wide-Swing Two-Spindle Two-Motor Polishing Lathe has to independent spindles and two motors in the base, one for each spindle, with V-belt drive from motors to spindles. Made in three sizes for three to fifteen horse-power motors. Distance from side of base to inside of wheels, up to 30 in. Cut shows model 5RR with five horse-power motors, spindles 107 in. long overall, distance from side of base to inside of wheels 30 in. Spindles mounted on over-size ball bearings. V-belts can be replaced without removing spindles or disturbing motor bearings.

The Hammond Model ROEH Wide-Swing Overhanging Spindle Polishing Lathe is designed for automobile fender polishing or other work requiring large working space around wheels. Ten, fifteen or twenty horse-power motors are mounted in the base, with V-belt drive to spindles. Spindle is mounted on four over-size ball bearings, which can be removed for replacing V-belts without opening bearing housings or disturbing motors. Cut shows Model 15 ROEH with fifteen horse-power motor in base. Spindle has 8 in. overhang from front of base and is 96 in. long overall with distance of 20 in. from side of base to inside of wheels.



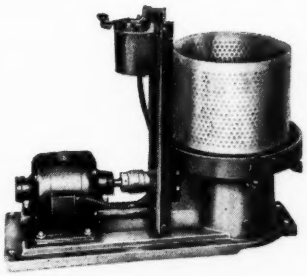
Hammond Model RR Polishing Lathe

Hammond Model ROEH Wide Swing Overhanging Spindle Polishing Lathe

Hanson-Van Winkle-Munning Centrifugal Dryer

Hanson-Van Winkle-Munning Co., Matawan, N. J., is offering a centrifugal dryer, the features of which include compactness, efficiency and speed in dry-

ing basket loads of plated work. Available in two dryer shell sizes—12x12 in. and 18x18 in.—the unit is especially recommended for use in conjunction with



Hanson Van Winkle-Munning Centrifugal Dryer

plating barrels since the small floor space required permits it to be placed close to the barrel. Transfer of the work is a simple operation and pieces to be dried may be placed directly in the perforated shell or in a separate basket which fits in the shell.

Power for driving the turntable at 600 r.p.m. is obtained from a ½ h.p. motor through a pair of bevel gears. Four roller bearings of ample size support the driveshaft and turntable without end play, reducing friction and vibration to a minimum. A conveniently located reversing switch allows the operator to control the direction of rotation at will. It is not necessary to bring the basket to a stop before operating the reversing control.

Iding's Polishing Cement

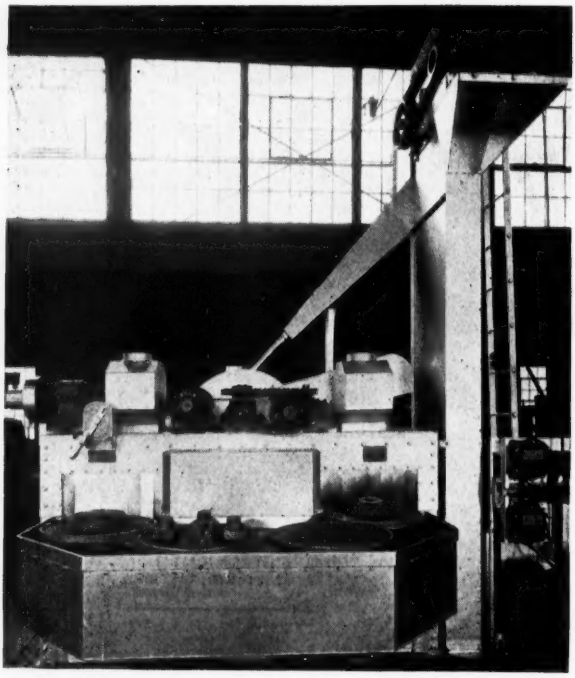
A polishing wheel cement, which is said to be made wholly of mineral substances, is being manufactured by M. P. Iding Disc Grinding Compound Co., Inc., 3534 W. Pierce St., Milwaukee, Wis. The cement is furnished in one grade, being prepared for immediate use and having a liquid bond the density of which can be regulated to conform with the sizes of abrasives and work to be polished. Due to the fact that the cement is furnished in air-tight containers and can be used directly from the container, loss due to evaporation is negligible. Since cement "sets" instead of "sticks", the object covered is said to become an integral part of the cement and the strength of the binder is dependent upon the strength of fabric or base to which it is applied. Regardless of the density at which the cement is applied, the tensile strength of the layer itself does not vary.

Iding's cement is practically odorless, and what little odor there is is not offensive and does not become rancid or change regardless of time of exposure. It retains its strength although exposed indefinitely. A liquid bond is available so that the cement can be reduced to the proper thickness if it is left exposed long enough to congeal in the container. The cement is easy to clean with hot water and does not have gummy, sticky qualities, making it a clean and sanitary product to use. It can be used directly from the container in which it is shipped. As it will not spoil, there is no loss when there is a quantity left over in the pail.

If artificial heat can be used, from one to four hours at 125 deg. is usually sufficient drying time, depending on the number of coats applied and the coarseness of the grain used, the coarser grains requiring a thinner coat than the finer. If dried at room temperature, from 12 to 24 hours is required. If it becomes necessary to remove an entire coating the wheel surface can be washed with hot water or steam.

American Wheelabrator Multi-Rotary Table

The American Wheelabrator Multi-Rotary Table, illustrated herewith, has been announced by The American Foundry Equipment Co., 557 Byrkit St., Mishawaka, Ind. The Wheelabrator Multi-Rotary Table consists of a series of tables upon which work can be carried through the Wheelabrator for cleaning. Certain types of castings, forgings, or stamped parts which might be scratched, bent, or broken in certain other types of cleaning equipment can be cleaned satisfactorily by the use of



American Wheelabrator Multi-Rotary Table

an abrasive applied by such a machine as the Wheelabrator.

The Wheelabrator Multi-Rotary Table consists of a number of independent tables, the number and diameters of which can be varied. The tables are attached to a guide which runs in a track that passes directly under the Wheelabrator and runs in a straight line for approximately 6 ft. Thus the tables are directed under the blast of abrasive from the Wheelabrator, within full blasting range of the abrasive as it leaves the wheel. The flat edge of each table contacts a moving belt which revolves the tables as they pass under the blast. The speed of the belt is variable, thus making it possible to vary the speed with which the tables are revolved as they pass under the Wheelabrator. After traveling through the blast, the tables follow the track out of the cabinet where the workpieces can be removed or reversed for a second application of the Wheelabrator blast.

In the Wheelabrator equipped with the multi-rotary table a load of abrasive is placed in an overhead hopper from which it is fed, via a chute and control gate, to the center of the Wheelabrator wheel. With the wheel revolving at a high rate of speed, the abrasive is thrown by centrifugal force from the blades of the wheel onto the work to be cleaned. The abrasive can be controlled as to both volume and direction of blast so that any type of cleaning and preparation can be accomplished from a light satin finish on light metal parts to the removal of dirt or scale from heavy casting or forgings. Sizes and types of abrasive can be selected according to the work to be done.

Spent abrasive, after being thrown from the wheel onto the workpieces, falls into a hopper and is fed by screw conveyor and bucket elevator to the overhead hopper for re-use.

The Wheelabrator is sturdily constructed and will operate efficiently over a long period of time.

G-E Electric Thickness Gage

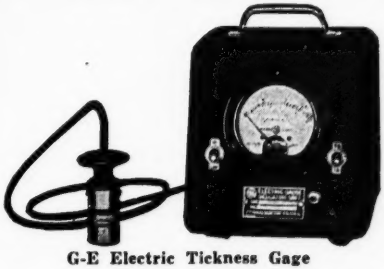
An electric thickness gage, developed for measuring the thickness of porcelain enamel, paint, or other nonmagnetic materials such as celluloid, glass, mica, etc., which have been applied to or laid on flat sheets or plates of steel or iron, has been introduced by the General Electric Company, Schenectady, N. Y. The gage permits quick and convenient measurement of the thickness of the material not only at the edges but in the middle or any other place where a flat surface slightly more than an inch in diameter can be found. Weighing only 7½ pounds complete, it can be used portably wherever a 110-volt, 60-cycle power supply is available.

The new instrument consists of a small indicating unit enclosed in a neat cast-aluminum cabinet, and a ½-pound gage head connected to the unit by cable. When the face of the gage head is held in contact with the surface of the material to be measured, the thick-

ness can be read directly on an indicating instrument mounted on the front of the cabinet. Because of its light weight, the gage head can be moved readily to any point on the surface and the corresponding measurement conveniently taken.

In use, the indicating instrument is first adjusted to read correctly with a known thickness of insulating material or a known air gap between the gage head and a sheet of steel of the same kind and of approximately the same thickness as that used with the material being measured. It can then be used to indicate the thickness of enamel within the range for which it has been set.

Thickness ranges of 1 to 5, 2 to 10, 5 to 25, 10 to 50, and 20 to 100 mils can be obtained. A separate scale on the indicating instrument is required for each thickness range. Either single- or double-range indicating units are available, the latter combining any two of the standard ranges. For measuring the thickness of nonmagnetic metal platings on steel, and of other materials



G-E Electric Tickness Gage

of less than 1 mil in thickness, a unit of modified design can be obtained.

"Standard" Selective Speed Polishing and Buffing Machine

The line of buffing and polishing lathes marketed by the Standard Electrical Tool Company, Eighth and Evans Sts., Cincinnati, Ohio, has been augmented by the addition of a selective speed machine built to provide any spindle speed required. When equipped with patented adjustable speed sheaves a spindle speed increase of fifty per cent may be obtained with an infinite number of steps. Power is supplied by an 1800 r.p.m. ball bearing motor.

The design of the machine is said to be of particular advantage in districts where direct current is now in use and there is contemplated a change over to alternating current. The machine may

Fig. 1—"Standard" Selective Speed Buffing and Polishing Machine

be installed with a direct current motor and when the change over occurs, it is necessary only to change the electrical equipment on the buffing machine.

Reference to Fig. 1 will show that a hand brake is provided for quickly stopping the spindle and thus reducing the time required for wheel changes. A shaft-locking device further assists in changing wheels. The push button operates a magnetic starter inside the pedestal, the starting having overload and underload voltage protection.

The spindle is of high grade nickel steel. The entire spindle may be removed intact for renewing belts without disturbing the ball bearings. The ball bearings are oversize and are mounted in labyrinth sealed chambers.

NEW SPRAY GUN

In the time it takes to adjust old fashioned paint spray equipment, you can write us for specifications and prices of the new Type MM Paint and Lacquer Spray Gun, which cuts both time and operating costs on every job and builds your profits. Bring your shop up-to-date with the new Type MM Spray Gun.

THE ALEXANDER MILBURN CO.
1436 W. Baltimore St., Baltimore, Md.

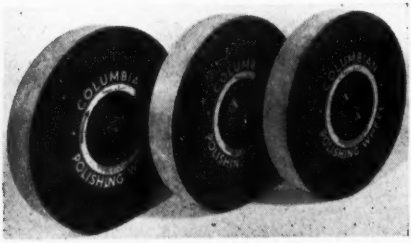
Fig. 2 illustrates the manner in which power is transmitted to the buffing spindle through four Vee cog belts. An

Fig. 2—View of interior showing power transmission equipment

elevating screw permits raising and lowering the motor to adjust tension on the belts. Belts and sheaves are guarded by a hinged guard. The machine is available in 3, 5, 7½, 10, 15 and 20 horse power.

Columbian Fibre Polishing Wheel

The Carborundum Company, Niagara Falls, New York, announces the introduction of what is said to be a distinctly



Columbian Fibre Polishing Wheels

new type of polishing wheel and which is being advocated for use in connection with Aloxite Brand TP and Carborundum Polishing Grain for all classes of metal and glass finishing work. The Columbian Wheel is produced by combining the strongest of vegetable fibres with a scientifically developed and controlled tough, resilient bonding agent. The result is the production of a wheel of even density and texture throughout. The manufacturer states that the wheel has no hard or soft spots and no ridges, and presents an unusually resilient cushion to the work.

The Columbian Fibre Polishing Wheel is made in three densities or grades: soft, medium, and hard. The wheels are "set up" with glue and abrasive in the conventional manner. It is to be noted that water, oil or grease have no deteriorating effect on the materials forming the wheel structure. To remove the old abrasive head, the wheel is simply washed in warm water or steamed without fear of change in wheel diameter or distortion of the wheel face. The wheel can also be dressed with dry pumice or an abrasive stick.

A distinctive feature of the Columbian Wheel is the specially designed metal hub, which is built into the wheel and perfectly centered. The hub provides for true, smooth running. Columbian Wheels are recommended on metal finishing operations where heretofore hard canvas, felt, and various types of compressed polishing mediums have been employed.

Stanley Bench and Pedestal Grinders

The Stanley Electric Tool Division of the Stanley Works, New Britain, Conn., now offers 7-in. and 10-in. grinders designed to incorporate a long spindle construction that provides more space between the wheels and the motor, making it easier to grind large, odd-shaped pieces. The grinders are recommended for general grinding, buffing, polishing, or wire brush work. They are said to be sturdy, vibrationless, and smooth-running.

The spindles are mounted in full ball bearings, which are enclosed against dirt and grit. The bearings are mounted close to the wheels to eliminate spindle vibration. The wheels are fully enclosed in guards, cover fitting over the rims of the guards to provide greater strength. The guards are easily adjustable for grinding at any point on the wheel circumference. End covers are easily removed for changing wheels. Two rests are mounted on the wheel guards and are adjustable to follow wheel wear. Stanley Safety Eye Shields may easily

be attached to the wheel guards, tapped holes being provided for this purpose.

The seven-inch grinder, designated as

Stanley No. 610 Pedestal Grinder

the No. 557, is equipped with two 7x1 in. grinding wheels, one coarse and one fine. The motor os 1/3 h.p. Length over all is 19¾ in. Shipping weight, 75 pounds.

The 10-in. grinder, No. 610, has two 10x1 in. grinding wheels, one coarse and one fine. The motor is 1/3 h.p. and the length over all is 24 inches. Shipping weight, 160 pounds.

Pedestals can be furnished with both machines.

Purolator Air Separator for Sand Blast Air Lines

Motor Improvements, Inc., 365 Frelinghuysen Ave., Newark, N. J., has developed a Purolator Air Separator for use with sand blasting equipment which is said to result in a better product and considerable reduction in the cost of metal finishing. The Air Separator is applied to the compressed air line and absorbs the oil, moisture and the fumes of overheated oil which have previously proved so detrimental in cases where the sand blast operator dons a gas mask and works in the sand blast room.

The Purolator Air Separator has a filtering element of brass and a special alloy of bronze enclosed in a metal case. The element surface is made of a special alloy bronze ribbon, wedge-shaped in cross sections and having rises 0.0005 in. high placed at intervals of ⅛ in. on one side of the ribbon, the other side being smooth. The ribbon is wound in a spiral around a brass cylinder having fluted sides so that the ribbon, standing on edge and being held apart by the rises, forms a series of slots each with a width of 0.0005 in. and a length of approximately ⅛ in.

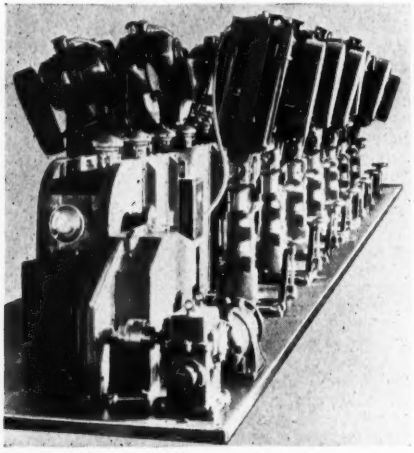
When compressed air enters the separator case, it strikes the inside walls of the case and the external surface of the filter element. These parts act as baffles and some of the oil and water is at once removed and drops to the sump in the bottom of the container. The greater part of the separation takes place, however, while the air is pushing through the 26,766 filtering slots in the filtering element.

The space within the cylinder body which is left open is filled with approximately ½ lb. of activated carbon, a 60-mesh screen and wool cap being placed at the top of the cylinder to prevent particles of carbon entering the air line. This carbon absorbs the dangerous fumes in the air. Its capacity is extremely large for its physical size and it needs replacement only once in six months.

Purolator Air Separator for Sand Blast Air Lines

Packer Polishing and Buffing Machine

The illustration shows a polishing and buffing machine built by the Packer Machine Company, Meriden, Conn., to meet a demand for a polishing and buffing unit which would be capable of producing a definite per hour production



Packer Polishing and Buffing Machine

requirement. The machine is equipped with 14 wheel heads, 10 of which are equipped with 10 h.p. motors and 4 with 7½ h.p. motors. Power is transmitted to the wheel spindles by multi-V-belts. Each wheel head is equipped with a Packer Automatic Composition Feeding Device. Work is carried to the wheels by 38 work-holding fixtures, mounted on a conveyor chain. The chain is operated intermittently, the intermittent movement being controlled by an indexing unit which is driven by a 3 h.p. New Departure "Transitorq" Variable Speed Unit.

Each motor on the machine has its own individual control and the machine is equipped with anti-friction bearings throughout. The center distance between work-holding fixtures is 24 in. The ball bearing spindles to which the work holding fixtures are fastened can be rotated at variable speeds, also driven by a 1 h.p. New Departure "Transitorq" Variable Speed Unit. The work spindles do not rotate at the loading stations; thus the work can be loaded and unloaded without difficulty.

The machine is 42 ft. long and 7 ft. wide and the weight of the complete machine is 16 tons.

Cesco No. 220 Wide Vision Chipping Goggle

The Chicago Eye Shield Company, 2298 Warren Blvd., Chicago, Ill., announces an improved wide vision chipping goggle made for impact hazard work and equipped with a new type super-safety lens that does not change direction of light rays passing through the lens. A number of other practical improvements have been incorporated in this goggle to insure greater safety, wearing comfort and maximum usefulness. The shape of the eye cup allows natural, full and wide vision.

The goggles are close fitting and edges contacting the face have a pure gum cushion binding. The large curved lenses are interchangeable by means of a simple hinged door. Super-safety lenses are a scientifically designed optical product and afford maximum protection with no interference to the vision of the wearer. The curvatures are such that the lens is entirely free from focus and the optical center is located so that the line of sight for an eye looking straight ahead through the lens suffers no deviation.

The lenses are made from a high quality crown glass and are free from bubbles and striae. The blanks are first molded to the approximate shape of the finished lens and then ground and polished in accordance with the latest opthalmic lens practice. The deep curved surfaces of the lens allow an angle of vision far greater than can be obtained in the conventional type of cup goggles. In addition to the optical properties outlined above super-safety lenses are placed through a special hardening process which greatly toughens

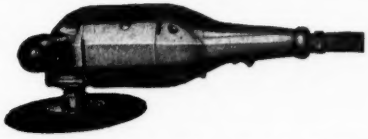
Cesco No. 220 Wide Vision Chipping Goggle

the glass, enabling the lenses to withstand severe blows and impact hazards.

Thor No. U-58 Portable Electric Sander

The Independent Pneumatic Tool Co., 610 W. Jackson Blvd., Chicago, has brought out the U-58 Portable Electric Sander shown herewith.

The U-58 Sander is intended for sanding, grinding, cleaning, preparing automobile bodies and fenders for paint jobs, smoothing wood surfaces and every application which might involve sandpaper or emery. Perfect balance and ease of handling permit most efficient operation. Armature and spindle run in ball bearings, giving wheel maximum torque. Accurately cut gears of alloy steel, heat treated, can be taken apart for inspection or cleaning with exceptional ease. Inspection of the motor can be made while the sander is running by simply removing two brush covers. Side handle can be used on either side of machine. Equipped with 7-in.



Thor No. U-58 Portable Electric Sander

flexible rubber pad and a box of twelve assorted abrasive discs.

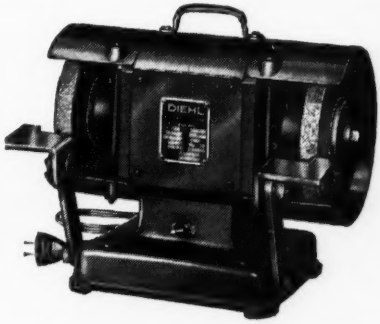
Bondlite Oil Paint

The Wilbur and Williams Company, 467 Park Square Bldg., Boston, Mass., has announced a new oil base paste paint which is stated by the manufacturer to do away with one of the most obstinate difficulties in painting. This paint, called Bondlite, can be successfully applied directly over solid calcimine without any preliminary preparations such as sizing or washing down. It is believed that the inherent qualities of Bondlite will make it possible to reduce materially painting time and costs. Free from drag or pull this paint can be applied with an unusually wide brush. Furthermore, one coat will provide complete coverage even when used over rough, porous or water-stained surfaces.

Bondlite is said to be actually five paints in one. For, in addition to being a sealer over calcimine and a sizer over porous surfaces, it provides flat, semi-gloss, or gloss finishes when mixed properly with turpentine, varnish or mineral spirits. Bondlite comes in white, buff and ceiling ivory and can be easily tinted.

Diehl Clearance Type Electric Grinder

Long parts or pieces of material can be ground on the Diehl Clearance Type



Diehl Clearance Type Electric Grinder

Electric Grinder, which has been placed on the market by the Diehl Manufacturing Company, Elizabethport, N. J. The grinder is designed, as shown in the illustration, with a flat face on the front side of the motor housing, permitting the periphery of the grinding wheels to extend considerably beyond the limit of the housing.

The grinder is furnished with two high quality grinding wheels, 6x¾ in., one of coarse grain and the other fine. Adjustable steel tool rests compensate for wheel wear and heavy steel guards afford maximum protection. The motor is rated ¼ h.p., 3450 r.p.m. for 110 volt,

USED BUFFS

64-68—1⅛" arbor—20 ply

Full disc - Loose - or Sewed

Thousands of every size

8"—8c each 9"—9c each

10"—10c each

MICHIGAN BUFF CO., INC.

4054 Beaufait Ave. Detroit, Mich.

60 or 50 cycle alternating current operation, and is totally enclosed. It is equipped with dust sealed ball bearings, convenient starting and stopping switch and 6-ft. rubber covered cord and plug.

The grinder is easily portable and is provided with a rugged cast iron base which eliminates the need for fastening to bench or table. Rubber insulating feet minimize the noise and vibration of grinding. The grinder is 10¼ in. high, 12½ in. long, and 8⅛ in. wide. Approximate net weight is 38 lbs. The entire unit is attractively finished in machine tool blue with nickel plated fittings.

Shaft attachments for drilling, sanding, and buffing which greatly increase the usefulness of the grinder can be supplied upon request. The attachments include a work arbor with drill chuck upon which can be mounted a sanding disc, cotton buffing wheel or wire scratch wheel. The drill chuck is of the three-jaw type and takes drills up to ¼-in. diameter. The sanding drill is furnished with coarse and medium grip belt.

Kote Wax Covering

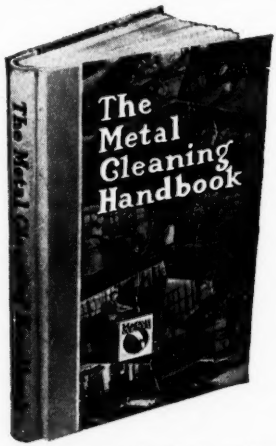
Hanson-Van Winkle-Munning Co., Matawan, N. J., announce Kote-Rax, said to be a non-contaminating, corrosion-resisting coating for plating racks.

Applied for dipping, Kote-Rax covers the rack with a tough, rubber-like film possessing high dielectric resistance and capable of withstanding considerable mechanical abuse. Tests made by the manufacturer indicate that Kote-Rax is not affected by immersion in the common solutions used in the following baths: chrome, nickel, cadium, zinc, copper, brass, silver, tin, and so on. Kote-Rax also withstands the action of solutions encountered in connection with the above plating operations. Racks protected by this coating have been used as long at two months without showing signs of deterioration. Old racks as well as new can be treated satisfactorily.

Kote-Rax must be heated for use in non-metalic tanks, the average application consisting of four dips at 230 deg. to 260 deg. F. It does not adhere to the metal but holds its position by shrinkage.

A complete Kote-Rax service is available for the larger plating shop. Job platers in strategic cities will be equipped to coat racks for customers who will not have a sufficient number to warrant installation of rack coating equipment.

METAL CLEANING HANDBOOK. This book, published by the Magnus Chemical Company, 61 South Ave., Garwood, N. J., to sell at a price of $1.00 covers the entire field of cleaning metal parts in all different kinds of industries. The book is bound with board covers and



contains 216 pages devoted entirely to this subject.

The text incorporates the results of years of scientific investigation of detergent or cleaning processes and is intended to be the answer to all cleaning problems in so far as metal is concerned. Taking up the various kinds of metal products in turn, the most efficient and economical equipment is described and illustrated and the action of the various kinds of cleaning agents upon different kinds of metal is described.

This book should be invaluable to the plant engineer or executive who is confronted with problems of cleaning metal parts that are used in production.

OILSTONES AND ABRASIVE SPECIALTIES. Users of oilstones and other abrasive specialties of the type that are manufactured by the Behr-Manning Division of Norton Company, Troy, N. Y., will be interested in a 36-page book which has been put out by this firm. The book contains descriptions and illustrations of oilstones, blade strop-pers, crystolon stones, emery cloth, flint paper, hand tool grinders, India oil-stones. pocket stones, sandpaper, sand-stone, saw gumming wheels and a wide variety of other stones, abrasive cloth and paper, and similar products. Copy free upon request.

Stanley ⅜ H.P. Flexible Shaft Grinder

A portable flexible shaft grinder that develops ⅜ h.p. and a speed of 18,000 r.p.m is now being manufactured by The Stanley Electric Tool Division, New Britain, Conn. The grinder is especially adapted for a wide variety of external and internal grinding operations on tools, dies, castings, and so on. The ⅜ h.p. universal motor provides ample power to drive a ½x½-in. emery wheel and maintain a high grinding speed on the toughest work.

The flexible shaft, which is 42 inches long, has a heavy rubber-reinforced casing with protection springs on each end. The handle piece is equipped with special ball bearings and a collet-type chuck to hold ¼-in. shanks. The cradle which is furnished with the grinder will hold the motor unit on a bench, or it can be suspended overhead.

The grinder is shipped ready for use except for grinding mediums. However, the manufacturer of the grinder carries a complete line of arbors, spindles, emery wheels, and mounted points for use with the machine.

HASKINS SANDING DRUMS AND ABRASIVE SLEEVES. Four pages of description of the sanding drums and abrasive sleeves made by R. G. Haskins Company, 4667 W. Fulton St., Chicago, Ill., are contained in a folder which is now being issued by this firm. Detailed information regarding accessories for use with flexible shaft equipment is included. Copy free upon request.

ALAKALI CLEANING COMPOUNDS. A solution to the cleaning problems inherent with all types and kinds of metal manufacturing is contained in a 4-page folder now being issued by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Mich. The bulletin features "Triad" alkali cleaning compounds and discusses the application of these compounds in the wide range of metal cleaning problems. Examples are quoted of the savings that have been made in various specific instances. The bulletin also points out production economies that can be effected through the use of Detroit-Rex specialized cleaning service. Copy free upon request.

RYERSON - ALLEGHENY STAINLESS STEEL BOOKLET. This booklet, printed in seven colors and devoted to the beauty, popularity, and endurance of stainless steel, is now being distributed by Joseph T. Ryerson & Son, Inc., Lock Box U, Chicago, Ill. The booklet is profusely illustrated with pictures of a wide variety of stainless steel articles and presents graphically the applications of Allegheny Stainless Steel in all lines of industry. The increasing popularity of stainless steel for all types of products is evident; also its use in equipment and production machinery where long life and improved processes are important factors. A copy of the booklet will be sent free upon application.

General Abrasive Handy Direction Wall Card for Setting Up Polishing Wheels

A convenient, informative chart containing complete directions for setting up polishing wheels is being offered without charge by the General Abrasive Co., Niagara Falls, N. Y.

Punched to hang on the wall in the polishing room, the card briefly outlines the proper procedure for setting up polishing wheels. Points covered include correct proportion of glue to water; glue heating; preparation of wheels preparatory to gluing up; sizing of wheels; application of glue and abrasive; dry room temperature and humidity; operating speed and wheel pressure.

Copies of the card, which measures approximately 11x14 inches, may be had as long as the supply exists by addressing the General Abrasive Co., 3106 Hyde Park Blvd., Niagara Falls, N. Y.

Bakelite Molding Technic. This manual on the art of plastic molding of Bakelite materials has been issued by Bakelite Corporation, 247 Park Avenue, New York, N. Y., in order to provide fabricators of plastic molded products with complete information regarding the process. Starting out with Principles of Molding, the book takes up the following subjects in consecutive order: Materials; Weighing, Measuring and Preforming; Molds; Presses and Pressure Equipment; Heating Media; Accessory Equipment; Finishing; Inspection of Finished Products; Plant Layout; Definition of Terms; Tables and Other Information, and Accounting. The book consists of 120 8½x11-in. pages between stiff board covers, spiral bound. Illustrations are used wherever necessary to make the text clear to the reader. The edition of this book is limited, therefore a charge of $1.50 is made.

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